SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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vention of Colliery Accidents.

Mr. HERMON'S PRIZE ESSAYS.

ILFRED CRESWICK'S FIRST PRIZE ESSAY—No. IV.

FALLS OF COAL OR ROOF.—Accidents from these causes a great measure, be avoided by having competent over- paying strict attention to Special Rules 7, 25, 26, each of must not only see after having sufficient material for the of the strata in his district always at hand, but also that upports are fixed in proper postions, and that when once ey be not removed until he has personally satisfied himself re will be no danger from an immediate fall of the strata r removal. The overlookers should at all times pay great n to the roof.

ACCIDENTS IN SHAFTS may be caused by any of the fol- defects, such as—

) From breakage of ropes and machinery;
) Carelessness of engineman;
) Defective construction of engine;
) Defective construction of cages;
) Defective construction of shaft and fittings;
) Carelessness of banksman and hanger-on;
) Carelessness of man working at repairs in shafts.

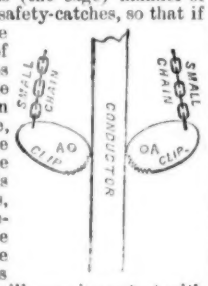
It would be well if a limit were placed on the time during a rope might be used for raising or lowering persons in shafts, ng fixed either at the cage or under the pulley wheels will supply the elasticity a rope loses with age, and so render it ble to breakage. Drums and pulleys round which wire-ropes ould have large diameters; they ought not to be less than t. Every rope should be able (when new) to resist some rd tests, to be determined upon for different materials and ns of ropes. Attention to Special Rules 8, 43, 44, 45, 48, 49, 52, 55, 56, 57, must be observed.

A person 18 years of age (Special Rules 1 and 42) is, in my n, too young to be trusted with the management of either an for drawing men or the superintendence of either the pit top bottom, and I think these rules would be much better if rs were substituted for 18 years.

areless engineman would probably draw the cage over the s of the head gear. I have known careful enginemen to do e defect may be either with the man or machinery; there are ers of "disengaging hooks" invented, to be fixed between the f the rope and the cage, so that when the cage approaches rously near the pulley-wheel, the "hook" strikes against either heel or some special contrivance, and causes the cage to be aged from the rope; perhaps these would be useful, but when atches should be attached to the head gear, so as to prevent ge from falling on being released from the rope. The Special Nos. 43, 44, 45, 46, 47, 48, 49, 50, 51, 55, ably teach the engine- his duty.

) This may exist in an engine having bad proportional parts or tive material, but I will pass over these defects, and proceed e main features, which are the drum, the drum-shaft, the break, he machine for indicating the position of the load in the shaft, rum should, as before stated, be of large diameter, and pro- with flanges, or horns (*vide* General Rule 11), to prevent the from working over the edge; the rope used for drawing men d not traverse the drum more than once. Each drum should ted with a "break ring." The drum-shaft (used for drawing should in no case be made of cast-iron—wrought or malleable is the most reliable material which can be used for this purpose. break should be attached to the drum of every engine of suffi- power to keep it from revolving in case the engine were to nd should be so arranged that the engineman can apply it, to rum at a moment's notice. There are many different arrange- of "indicators" (fulfilling its requirements in General Rule 12), n no case should they be dependent on string, or other flexible rial, for their accuracy.

) Cages should have a cover overhead to protect men (whilst e shaft) from falling materials; also there should be a hand- within the cage for the men to grasp whilst riding. Before a is allowed to be placed in a shaft it should be suspended in the manner as it will be when hung from the drawing rope; it then be ascertained if the "guide shoes" for the conductors are ab under one another, and the centre of the bottom of the cage ld be exactly under the rope; when a cage is loaded the weight ld be so distributed as not to alter its (the cage) manner of ng. Cages should be provided with safety-catches, so that if ope, &c., breaks, the conductors may be ed by them; a very good "catch" is of form. At A, A, pins pass through clips are securely fastened to the cages; these are free to revolve on the pins; when eight of the cage is taken by the rope, mall chains attached to the clips at one and the shackles (which connect the and rope) at the other, elevate the ends e clips furthest from the conductors, because the pins, on which the clips re- , are above their centres, they (the) recede from the conductors; but if the breaks the shackles and small chains drop, and the lower sides of the clips will come in contact with onductors, and the greater the weight of the cage the tighter the clips be wedged. The necessary apparatus must be fixed, to keep corves from falling out of cages.



) It would be well, and to the advantage of the owner and afety of the colliers, if all shafts were lined throughout with , stone, or other durable material. Sheeting boards should not lowed as permanent lining for shafts. There should always be distinct and separate shafts, or other distinct communications een the surface and the seam of coal being wrought, so that in of need men may use either communication. Drop gates should ed at the top of every "working shaft," so that when the cage t there all access to the shaft will be closed. No opening in ide of any shaft not being at the bottom of the shaft should be allowed to be used by men (unless with the underground viewer). All Special Rule 6 must be carried out, and in no case should coals be allowed to be raised or lowered from there unless a stage is erected so as to form a bottom to the shaft at that point. Conductors, to guide the cages, should be fixed in every shaft where required by the Inspector, and they should be fixed in a true plumb-line, and in no case should a "pass-bye" be allowed in any shaft without first obtaining the Inspector's sanction. The head-gear of every colliery should be high, so as to prevent overcrowding as much as possible.

(F.) The duties of the banksmen and hangers-on are plainly set forth in rules Nos. 46, 47, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62; but I may again state here that a person 18 years of age cannot command the deference which is due to banksmen or hangers-on. The banksmen should be very careful to prevent anything from falling down a shaft, therefore no loose material should lie about the top of any "working shaft."

(G.) The remedy rests mainly with themselves, but it is important that the steadiest and most experienced banksmen and enginemen or hangers-on are employed on such occasions.

As this essay is on the prevention of accidents in mines, I think the Inspectors should be consulted, as stated herein, for I am persuaded that had such been the case heretofore numerous great errors would have been prevented, which afterwards, on account of the expense or impossibility of alteration, are neglected. I quite appreciate what is said about the desirableness of owners and agents, being the responsible persons for the safety of the miners, and not the Government, but the miners must be protected, and if my suggestions were carried out the effect would be this—the miners would know that every new colliery was laid out as safely as possible, and that there is sufficient ventilation for ordinary occasions; also that the Inspector can see a just periodical report of the state of the workings and of discipline; the miners, too, can have this privilege. The colliery owners, agents, and workpeople will, at the same time, be responsible for efficiently working to the rules as heretofore.

THE IRON AND STEEL INSTITUTE OF GREAT BRITAIN.

The Iron and Steel Institute of Great Britain on Monday commenced their meetings at Liége—the principal hardware town of the little kingdom of Belgium. It is surprising what an amount of interest, from an industrial point of view, attaches to this country. Since it became an independent kingdom, in 1839, it has gone on steadily in the march of progress, undisturbed by the throes that have revolutionised neighbouring nations, and altered the map of Europe. To go no further back than the late Franco-Prussian war, it will be found that, although its geographical position almost necessarily involved it in that conflict, there was no such serious cessation of industry in Belgium as in neighbouring nations. Extending to 11,375 square miles, and containing 384 inhabitants to each square mile, Belgium is at once the smallest and the most populous nation on the Continent. Relatively to its size it is also the richest and most prosperous. Iron and coal are the foundations and bulwarks of its commerce; and as civilisation advances it is found that these resources are a much more certain and permanent source of wealth and power than all the treasures that fact or fable have assigned to Golconda's shores or to the auriferous kingdom of Peru. Herein Belgium and England have much in common. Both must stand or fall by the duration of their industrial resources; and, although varying in quality and degree, the industrial resources of both are the same in kind. To these facts the rivalry and jealousy existing between the two countries is attributable. That jealousy is not the "green-eyed monster" that disturbs the tranquility of individuals and of families; nor is that rivalry of a kindly likely to lead to dangerous and untimely results. On the contrary, the operation of these qualities applies only to those victories of peace that have been pronounced on high authority to be more renowned than those of war. Each country has advantages over the other; and neither is so perfect but that they may learn useful lessons by a comparison of notes. It is this end that the Iron and Steel Institute is specially calculated to promote. Already it has held meetings in all the principal emporiums of metallurgical art in the United Kingdom. Middlesborough, South Wales, Dudley in Staffordshire, and Glasgow, have each been visited in turn. The only centre of trade yet unvisited at home is Barrow-in-Furness. The turn of that infantile but highly prosperous district will come next. Meanwhile there is much in Belgium to justify the selection of the present visit. I have already alluded to its competition with England—a competition that has some time chagrined and alarmed English ironmasters, as they saw contracts for manufactured iron accepted by the Belgians at 1*l.* per ton less than they could be undertaken for at home. But, apart from this, the geology and mineralogy of Belgium, its blast-furnace practice, and its metallurgy in general have many unique features calculated to command the attention and interest of those members of the Institute who have visited the country for the first time.

A few remarks relative to the general conditions under which the staple industries of Belgium are carried on will suitably introduce me to the more recondite and technical phases of my enquiry. A report recently presented to Parliament by Mr. Pakenham, Her Majesty's Consul here, gives some rather interesting information on this point. In not a few parts of Belgium the subdivision of property is so great that the masters are almost as numerous as the men. Thus it happens that in the province of Antwerp there are 108,360 masters to 106,624 men. In the province of Liége, however, we find a great improvement on this state of matters, the masters numbering 5679, as compared with 55,126 men. The industrial classes in Liége are better off than in any other part of Belgium, and their condition, owing to the extremely prosperous state of the iron and coal trades, has greatly improved within the last two years. Mr. Pakenham calculates that there are in Belgium employed in mineral and metallurgic industry 42,624 masters and 172,678 men, and he distributes the latter as follows:—

Quarrymen	21,781
Workers in calamine, galine, pyrites, and iron mines	7,941
In ironworks and foundries	18,734
In zinc manufactories	3,176
In steel manufactories	260
In glassworks	8,344
In metal and ceramic products and manufactories	23,160
In coal pits	89,282

The largest ironworks in Belgium are those of Sir John Cockerill and Co., which are situated at Liége, on the site of what was formerly the Bishop's Palace. These works have a curious history. An annual sum of 1,000,000 fls. was placed at the disposal of the King in 1822, for the encouragement of industry by premiums, loans, and other means. His Majesty, wishing to improve the method of smelting and manufacturing iron, invited Mr. Cockerill to settle in the neighbourhood of Liége, and gave him a large sum by way of loan in order to assist him in the extension of his works. A condition was also imposed upon Mr. Cockerill that the ironmasters of Liége and Namur should have liberty to visit his works, in order that they might acquaint themselves with the true principles of the art of metallurgy. The works thus established have been extended from time to time until they are now of vast size. Situated on the banks of the Meuse—a slow river, and very suitable for the purposes of navigation—they cover altogether 90 hectares—a hectare being equivalent to two English acres. One eighth of this enormous site is entirely covered by buildings. They employ over 7000 operatives, inclusive of the mines and the auxiliary works of Antwerp and St. Petersburg. They can produce annually 50 locomotives of the largest size, 70 to 80 marine engines of 4 to 1000 horse-power, 1500 lots of mechanical construction, 3,000,000 kilogrammes of bridges and like structures, 14 ships and boats requiring 5000 tons of material, besides an annual production of 7,500,000 kilogrammes of wrought and cast steel, steel rails, tyres in steel and iron, and steel castings for machinery; 10,000,000 kilogrammes of plates and sheets, merchant iron, and specialites; and 25,000,000 kilogrammes of rails. The works of Palmer's Iron Shipbuilding Company, at Jarrow, are the only establishment in England that can fairly be compared with the works of Seraing. Both of these works, indeed, are so identical that the one might almost have been modelled on the other. Both raise their own minerals, both carry on the manufacture of iron through all its intermediate stages until it takes the form of ships, bridges, and other structures, and both are the largest of their kind in the respective countries to which they belong. I have a dim recollection of Mr. Charles Mark Palmer taking credit to himself and to his workmen, several years ago, for the expedition with which they had turned out vessels required for some great emergency. I believe that one man-of-war, designed to operate against Cronstadt during the Russian war, was turned out in three and a half months. Those of your readers who have a more perfect recollection of the event may be interrested in comparing it with the smartest thing ever achieved in the same way by Sir John Cockerill and Company. It was on June 18, 1863, that two armour-plated monitors, with towers, propellers, and machines for towers, ventilators, gun carriages, centrifugal pumps, and accessories, were ordered of the Seraing firm by the Russian Government; on October 24, 1863, the monitors were sent to St. Petersburg to be finished, and on June 13, 1864, they were booked to the Imperial authorities, fully equipped and armed, having thus been commenced and completed within 12 months. It is not my business to go into a full description of these gigantic works, which are, on the whole, pretty similar to other factories of the same kind in England; but I cannot help adding that they are in themselves sufficient to raise Belgium to the rank of a great iron-producing country, and they will favourably compare with the great Essen Works of Prussia, the Creuzot Works of France, the Cambria Works of Pittsburg, U.S., or the many gigantic establishments that fabricate iron an steel in our own country.

I have selected the Seraing Ironworks as an example, and the best type of continental iron-making establishments. *Ab uno disce omnes.* There are numerous other large ironworks between Brussels and Liége, and on the banks of the Meuse; but none of them will bear comparison for size with those of Seraing, nor have any of them such a deeply interesting history. The average height of the Belgian blast-furnaces is from 40 to 45 ft., or about the same size as the Staffordshire and Welsh furnaces. Their production does not exceed 50 to 55 tons each per 24 hours. This is about 200 tons per week less than the average of the Cleveland blast-furnaces; and, as there is little difference in the cost of the labour employed, there is a very manifest advantage in favour of the North of England. It is in the economy of the raw materials used in the blast-furnace that the Belgians excel the English ironmakers. As a general thing, no more than 115 tons of coke are used to smelt 100 tons of iron in Belgium, whereas in Wales, Staffordshire, and Scotland the consumption of coal is much greater. So far as the North of England is concerned, I believe that the consumpiion of coke per ton of iron made will not be more than the Belgian average, and in some cases—as, for example, at Ferryhill, where they make 1 ton of pig with 18 cwts. of coke—it is rather less. But this economy on the part of the ironmakers of Belgium becomes all the more notable when it is considered that the richest ores used in that country do not contain more than 35 to 37 per cent. of iron, while there is a large quantity used that contains no more than 26 or 27 per cent.—a percentage which, even in the North of England, where the very poorest ores are found, would hardly be considered worth the trouble and cost of reduction. Besides this, the ores of Belgium are, as a rule, exceedingly hard and intractable, and they have not the same opportunity for absorbing oxygen that belongs to some of our English ores that are found near the surface of the earth. It is, in ironmaking, an almost axiomatic proposition that, *ceteris paribus*, 25 per cent. more fuel is required to reduce an ore yielding only 30 per cent. of iron than an ore would need that contained 40 per cent.; and, considering the above facts, it is probable that Mr. Samuel Plimsoll, the member for Derby, was not far wrong when he declared, after a close comparison of English and Belgian metallurgy, that "Belgian ironmasters get, on a very moderate calculation, more than double the work out of 1 ton of raw fuel than we do." The question is thus naturally suggested, What sources of economy known and practised in Belgium have yet to be learned in England? Each member of the Institute will be afforded ample opportunities for answering this question for himself; but I may remark that the Belgian mode of treating the raw materials before charging them in the furnace appears to be superior to the English. The coke, ironstone, and lime are reduced to small lumps, about the size of a moderate potato; and, after being thus suitably broken, they are mixed together in given proportions, instead of being rudely and

carelessly thrown into the furnace in separate barrowsful, as the practice is in England. The men whose duty it is to charge the furnace are exceedingly careful to preserve a uniform mixture in the distribution of the materials entering the furnace; and to assist its friability a jet of water is occasionally allowed to play upon the ironstone before being used. It is the custom also in Belgium to collect the waste gases of the furnace by a bell, and afterwards utilise them in heating the blast and the boilers that raise steam. Another cause enabling the Belgian producer to take up an advantageous position in the English market is the cheapness of transit by rail, which is fully one-half less, taking it all round, than the charges in England. This superiority is due to the fact that the Legislature of Belgium has done a great deal to stimulate the development of railway enterprise. Belgium was the first European State that undertook the construction of railways at the public expense, and at the present time there are close on 400 miles of State railways laid down, at a cost of nearly 5,500,000*l.* sterling. It occurs to me, however, that Belgium would prove a far more powerful rival to England than she now is if the improvements introduced into the Cleveland district within the last ten or twelve years were generally adopted. The coke used in Belgium is very analogous in composition and character to the coke used in the Cleveland furnaces; it is capable of resisting a great pressure in the furnace, and there does not seem any good reason why the Belgian ironmaster should not carry his blast-furnace to the height of 80 or 90 ft. with advantages equally as great as those that have accrued to the North of England.

Speaking at the Middlesborough meeting of the Iron and Steel Institute, held in September, 1869, Mr. Edward Williams, of Bolckow, Vaughan, and Co., declared he was firmly of opinion that, whether they considered the men who were the leaders of the ironworkers, the machinery in use, or the ironworkers themselves, Englishmen need not have any fear or shame in being strictly compared with the machinery and men of the Continent. In the main, I believe that this *ipse dixit* is pretty correct; but there are one or two important points in which Belgian ironworks and ironworkers may justly claim to be superior to those of England. Probably the first thing that strikes the visitor to a Belgian iron-making establishment is the extreme neatness, order, and cleanliness that prevails. Qualities that are only conspicuous by their absence in our English factories predominate over the Belgian. For example, all the walls of an ironworks here are whitewashed, and although it is now the height of summer, everything appears to be kept tolerably cool by the judicious use of a plentiful supply of water sprinkled all over the premises. Were this system made operative in England the frequent cessations of labour induced by the extreme heat of June and July would probably be obviated, or at least reduced to a minimum.

As anything savouring of invidiousness must be more or less dangerous, I must deal very gingerly with the comparative merits of the English and Belgian ironworkers. Remembering the fate that overtook Mr. Bernhard Samuelson when he entered the same field of enquiry, and also bearing in mind that "much may be said on both sides" of every subject, I shall abstain from being too opinionative, and speak more of the social position and customs of the continental miners and ironworkers than of their inferiority or superiority to those of England.

It is calculated that there are 120,000 colliers and ironworkers throughout Belgium. Their average wages for the last five years has been 3·4 francs per day, or 912 francs per annum. This does not include the wages paid to women and children, who are largely employed in colliery labour, and whose wages are so low that their inclusion reduces the average of all hands employed about collieries and ironworks to 708 francs per annum, or 2⅓ francs per working day. Out of the earnings of the colliers various contributions are paid. One of these is levied under an arrangement called the *Caises de Secours*, which is a sort of sick or accidental assurance company, temporary in its action. As a rule, a club of this kind is attached to each pit. Another organisation, established with similar objects, but on a broader or national basis, is called the *Caises de Prevoyance*; and although membership is not compulsory, its benefits are so universally recognised that 90 per cent. of the miners are contributors. Altogether, the contributions paid towards these societies amount to about 16·48 frs. per annum, or about two per cent. of their whole earnings.

The colliers of Belgium work considerably longer hours than their English *confreres*. Ten hours a day is the usual thing, but a twelve-hours shift is not at all uncommon. One of the largest pits in the country is the Grands Sereuses, where about 700 hands are employed. The depth of this mine is 560 yards, and it has 14 or 15 seams, varying from 1 ft. to 4 ft. 6 in. in thickness. The employment of girls and children in loading the skips, and other forms of pit labour is a feature of Belgian colliery life which has happily become a thing of the past in England. There seems to be much need of a Factory Act to prevent the continuance of this degrading practice. Yet both men and women seem to be comfortable, and withal very happy. Their sports and pastimes are very much akin to those of our Durham and Northumberland pitmen. In their hygienic laws, ball, pitch and toss, and athletic exercises of various kinds form a prominent place. They do not, however, appear to be actuated by that strong fancy for the canine race which is so distinguishing a characteristic of our own North Country pitmen. As for their diatetics, it is observable that they seldom indulge in animal food—not more than twice a week—and that their favourite dish is *soupe maigre*.

The Belgian coal field covers an area of 100 miles in length by four or six miles in width. It thus possesses only about 900 miles of coal field, and yet it raises nearly 14,000 tons per square mile of coal field every year, or more than the whole of France. There are about 150 different seams of coal, of which 120 are workable. Within the last ten years the mode of working the Belgian coal measures has undergone considerable improvements. The thickest seams were formerly worked by the method known as the *methode par eboulement*, which consists in the attack of the blocks of coal with picks, to the great danger of the miners, who were not always successful in escaping at the moment the coal became detached. By this primitive method very little more than one-third of the coal was actually extracted. Fissures were left in the superior strata through which the surface water found its way to the coal beds underneath. The English long-wall system of working, known here as *par remblais*, is now generally adopted. So far as I can ascertain there is nothing in the shape of coal-cutting machinery at work in the collieries of Belgium. England is taking the lead in the perfection and use of mechanical coal-cutters, and nowhere else are coal miners able to earn such large wages and work such short hours. One would think, considering the relative circumstances of their miners, that Belgium ought to be able to produce cheaper coal than England. Yet such is not the case. Coal and coke, both for manufactory and for household, are a trifle dearer in Belgium than at home.

The high lands around Liége contain the best coal of the Belgian coal measures. Some of the lower beds, however, yield so much ash that the coal is unfit for domestic use, and it is no uncommon thing to mix earthy matters with some of the purer varieties in order to retard the rapid consumption that takes place. It is a peculiar feature of the Belgian coal measures that the seams occasionally run for hundreds of yards in a vertical direction. In England they are commonly horizontal and regularly defined. It is estimated, however, that the zig-zag shape of the Belgian seams gives a much larger yield than could be obtained from the beds of Durham and Northumberland. There are four different qualities of coal, found at various depths. The upper measures are suitable for gas making purposes; the next group yields a coking coal, not unlike that found in South Durham. Underneath this, again, there are beds of coal used for manufacturing purposes, called the *charbon de forge*; while the lower beds yield a coal specially adapted for household use. Great exertions are made to economise the dross and refuse coal. Hence there are several works around Liége for coal-washing, and I am not sure but it was somewhere in this neighbourhood that Mr. Morrison, of Newcastle, first saw this practice adopted. At any rate, it is well known to be of continental origin, and if we had never got another hint from our Belgian neighbours, this one—which enables us to turn to profitable account the dross which was allowed to accumulate as rubbish near the pitheads—entitles them to our gratitude. Piecework is not carried on in Belgium to the same extent as in England. There are no chartermasters, but the employer himself pays the workpeople directly a fixed daily wage. It is usual to keep eight days' wages in hand as a guarantee of good behaviour.

There is in Belgium a regulation providing that no mining operations shall be commenced until the probable existence of the mineral intended to be won shall be proved to the satisfaction of the "Counseil des Mines." The Government takes under its own control the right of disposing of the mineral, and each mineowner has to pay into the national treasury a double royalty—the *redevance fixe* and the *redevance proportionelle*. The first amounts to 10 centimes per hectare per annum, or about 1d. for each 2½ acres; the second averages 2½ per cent. of the net produce. There is also a royalty payable to the proprietor of the land, divided, like the national impost, into a fixed rental and a proportionate royalty. The first varies from 1 to 2 francs per hectare, while the second, according to the conditions of the mine, varies from 1 to 3 per cent. on the net produce.

Nearly all the collieries in the Liége district have been thrown open for the inspection of members of the Iron and Steel Institute. The Government Inspector for this division and his assistants are eager to place every facility at the disposal of the Institute, and will accompany those members who may be desirous of making the acquaintance of the mines.

So far as the ironworkers of Belgium are concerned, I should think that they have not the same physical vigour or power of endurance that we meet with in English ironworkers. They do not afford themselves such a generous diet, as a general rule, and as for drinking, the light beer of Belgium makes sobriety almost essential. The wages paid to Belgian ironworkers are from 1s. 6d. to 2s. per day less, taking them all round, than those earned by the ironworkers of the North of England. In some kinds of labour the discrepancy is much greater, as, for instance, in the case of puddlers, who are paid about 6s. per day in Belgium, as compared with 13s. 6d. per ton in the Cleveland district.

Most of the members who had come over from England spent the Sunday in Brussels, and journeyed to Liége by the 10 A.M. train from the capital on Monday. Arrived at Liége they were received at the station by the members of the Belgian Reception Committee. Bands of music stationed upon the platform played the Queen's Anthem, flags and evergreens were plentifully used in the ornamentation of the station and the buildings in its vicinity, and both on the platform and outside there was a large crowd, who cheered lustily as the train drew up. In private carriages, placed at their disposal by the Belgian Reception Committee, the members of the Institute were conveyed to their respective hotels. At two o'clock a formal reception of the Institute took place in the Hotel de Ville, where M. Piereot, the burgomaster, addressed to the Institute a very cordial welcome. Mr. I. L. Bell, the President of the Institute, then thanked the municipal authorities of Liége for the cordiality with which the Institute had been received, and, after the "wine of welcome" had been passed round, the company adjourned to the Academical Hall of the University, where the President (Mr. Bell) delivered his inaugural address, from which we extract the following:—

"It is only proper to observe that any attempt to institute a rigid comparison between the expense of manufacturing iron in different countries, based on figures as factors, would only lead to fallacious results. This is due to natural differences in the raw materials of coal and ore, and to the fact that in Great Britain dearer labour has forced upon the manufacturer more complete arrangements for its economy. Messieurs Gruner and Lan, in their very comprehensive and able work on the state of the iron manufacture of England, written in 1862, mention, in regard to wages, that labour which in France costs one franc commanded 1s. with us. Without knowing their opinion I arrived at the same conclusion as regards France, and the same difference appears to obtain in Belgium and Germany when compared with the rates then prevailing in Great Britain. I shall not venture to express any views on the future of the labour market in either the British or continental iron trade. As you are all aware, within the last year or 18 months, under the influence of an unusual demand for every species of industrial product, wages have experienced, generally, the most extraordinary and unlooked for changes. In the ironworks with us it may be taken that the rates of to-day are 50 per cent. above those of 1871. So far, however, as I have been able to ascertain, the increase which has taken place on the Continent is not above one-half of that which has been conceded by the English and Scotch ironmasters. The class which is directly benefitted by an augmentation in the value of the product of the soil is, of course, the agriculturist, and it might be thought that so far as the exportation of provisions tends to raise the cost of living in the exporting country, the manufacturing interest derives the reverse of any advantage from the change. Against this, however, we have the admitted fact that concurrently all branches of industry in Western Europe have progressed with strides unknown in the world's previous history. As regards iron this is strikingly true, and in spite of any increased cost of production due to higher wages, improvements in machinery, and in some of the processes themselves, have until very recently enabled the ironmaster to deliver the metal to the consumer on as favourable terms as formerly. Leaving the present abnormal condition of industrial affairs on one side, and confining ourselves to the relative state of the manufacture of iron in Great Britain and on the Continent, as it existed two years ago and for some time previously, the obvious question arises as to what the supremacy of the former is due in the matter of quantity produced. In the actual cost of a given amount of labour we stand in an admittedly less favourable position than our colleagues in Belgium, France, or Germany. Do we possess greater natural advantages in the possession of raw materials than they, is the question to which I propose shortly directing your attention. In respect to ore, many difficulties intrude themselves in the enquiry, due to great differences which exist in the facilities attending the extraction of the mineral and its conveyance to the furnaces in different localities of the same State. As an example, in our own country the cost of ore on a ton of iron varies from 12s. to 40s. So it was in France, speaking of it before the war with Germany, where ironstone yielding 35 per cent. of metal was delivered at the furnaces at less than 3s. per ton, while at other works a ton of iron cost 44s. for the ore they were smelting. The relative advantage enjoyed by either nation must, therefore, be determined by the proportion of the cheaper and dearer varieties consumed. After a very minute investigation on this point, Messrs. Gruner and Lan, in the work already mentioned, settled the average difference in favour of France, at 8s. (10 fr.) on the ton of pig-iron; and, according to these very competent authorities, Belgium is stated as being then equally favourably situated in respect to the cost of its ore. The German works on the Rhine have to deal with somewhat more expensive sources of iron than either of the other two countries, but this inferiority of position is partly neutralised by cheaper fuel, as will shortly appear.

And now a few words on the question of coal, which, during the last 12 months, has proved an object of such absorbing interest to the whole civilised world. Of this material of the ironmakers' art, Great Britain furnishes, in round numbers, twice as much as Belgium, France, and Germany put together. This she is able to do by virtue of the number and extent of her coal fields, but it is a fallacy to suppose the iron trade of the British Empire has expanded to its present proportions in consequence of coal being worked much more cheaply than is the case in the three other States with which we are comparing it. To place this clearly before the meeting, I will give the cost given me of raising a ton of coal in different places during visits paid in the year 1867:—

Belgium, 5s. 7¼d., 7s. 1¾d.—Averages, 6s. 4½d.

France, 3s. 0½d., 4s. 2d., 4s. 9½d., 5s., 5s. 2½d., 5s. 4½d., 6s. 0½d., 6s. 7¼d., 6s. 7¾d., 6s. 9½d.—Averages, 5s. 4½d.

Germany—Rhenish Prussia, 4s. 8d., 4s. 8d., 4s. 9½d., 5s., 5s. 7d.—Averages, 4s. 11½d.

In Great Britain, at the same time, we should probably not be far from correct in accepting 4s. as the average cost of delivering the fuel at the pit's mouth in the chief ironmaking centres of our own country. To all these figures has to be added the cost of conveying the coal to the ironworks, and this, in the case of Belgium and Germany generally, will be done as economically as with ourselves, inasmuch as the furnaces and mills, like our own, are placed on the coal fields. In France, on the other hand, the fuel has occasionally to be conveyed considerable distances, but in some cases the ironworks are established near the coal mines. The expense of transport in this last-named country sometimes amounts to as much as 8s. (10 frs.) per ton, but this high charge is usually met to some extent by an advantage in the price of the ore. The truth, however, is that if we wish to arrive at a sound appreciation of the subject under discussion we must dismiss from our minds all question of cost, and confine our attention to the market value of coal, a value which of course is determined by the relation borne by the demand to the means of meeting it. In France the supply is so far below the requirements of a large nation that a considerable deficiency has to be made up by importations from abroad, incurring thereby a heavy charge for carriage. Coal under these circumstances was, according to Messrs. Gruner and Lan, fully double the price it commanded in England in 1862. The difference between the cost and market value at the pit I found in 1867 was from 4s. 6d. to 5s. per ton. Belgium and Rhenish Prussia, on the other hand, are both coal exporting countries, and were able to raise the mineral at the period we are considering in such quantity that the margin between the cost of production and sales was from 2s. to 2s. 6d. per ton in the former, and from 2s. 3d. to 2s. 9d. in the latter. Ore costing, according to the French authors referred to above, 8s. less on the ton of pig-iron than the average of that smelted in Great Britain, gave this country with its cheaper coal in 1867 an advantage not exceeding on our entire make a few shillings per ton over Belgium; and in Rhenish Prussia the lower price of fuel would go far towards enabling the German smelter at that time to work as economically as the manufacturers near Liége and Charleroi. Thus it will be seen from what has preceded that Great Britain owes the pre-eminence she has hitherto enjoyed as an ironmaking nation, not so much to her ability to work coal greatly below the cost of that obtained from the mines of Belgium, France, or Germany, but because she possessed what may hitherto have been regarded as unlimited powers of production in respect to her fuel.

A complete revolution in prices has occurred since the date of these comparative estimates. Notwithstanding the enormous coal-producing powers of Great Britain, the demand upon its resources has overtaken, indeed gone beyond, its present means of supply; and, to the infinite amazement of everyone, the selling price of furnace coke rose in the chief seat of its manufacture—the county of Durham, to about double that charged two years ago to the least favourably situated ironworks in France. It may be further observed as a fact worthy of notice that according to the price currents of the day coke is as dear in the North of England as it is at Charleroi. Included in the requirements made on the British coal fields are some fifteen millions of tons taken by foreign countries, a quantity which it is needless to say is far in excess of the deficiency which has been the cause of fuel rising with us to fully three times its former figure. Leaving on one side the improbability, indeed the impossibility, of such a change in our commercial policy as that of forbidding the export of coal, it is open for us to imagine the probable result of such a course of action. The 15 million tons would be thrown on our hands, and the continental ironmasters would have to compete with those of our country; the latter drawing their supplies of fuel from an overstocked market, and the former buying one with coal at famine prices.

It may be alleged, and with reason, that the recent exorbitant prices are opposed to the public good, but we must look to the natural course of events, and not to legislative interference for working the cure. What I would respectfully submit is that most instructive lessons in the all important science of political economy are involved in the experience of the last year or two. As this address, however, is intended to be of argumentative character, and I have already exceeded the time allotted to me, I must take leave of the subject by commending it to the careful consideration of the members of the Institute, foreign as well as domestic.

It now only remains for me to express the grateful sense we, representing the Iron and Steel Institute, entertain of the hospitable and kindly feeling which has prompted our Belgian friends to invite us to visit their country. In order to give dignity to the occasion, we have had the honour of being officially received by the Mayor and municipal authorities at Liége. This great act of courtesy, eminent as it does from the governing body of one of the most important cities in the kingdom, demands at our hands the most cordial acknowledgment. By virtue of the honourable office I hold as your president, I ask to be allowed formally to tender to the ironmasters and other gentlemen who have generously promised to afford an opportunity of inspecting their respective establishments. This simple expression of feeling will, I feel confident, be warmly supplemented personally by individual members of the Institute. They, no doubt, like myself, will impress on present hosts the gratification they would experience on receiving within works anyone connected, however remotely, with the great metallurgical mining industries of Belgium.

Mons. M. L. TRASEUSTER, president of the Belgian reception committee, briefly replied to Mr. Bell's address, complimenting the Institution on the position of honour and usefulness it had already attained, and assuring its members of the cordiality with which the Belgian ironmasters welcomed them to Liége.

The PRESIDENT announced here that the King of Belgium had graciously issued an invitation to the members of the Institute to take part in a reception to be held in the Palais Royal, at Brussels on Thursday evening. He added that a special train had been provided by the reception committee to take the members from Liége to Brussels the same evening.—Both invitations were received with loud cheers.

The SECRETARY (Mr. Jones) then stated that the scrutineers—Messrs. Downey and Addenbrooke—had given in their report, which showed that about 70 new members had been elected, while 2[illegible] others had been passed by the council, and provided with special members' tickets, giving them permission to attend the present meetings.

This closed the proceedings for the day. In the evening there was a grand *fete* at the Jardin d'Aulimatation in honour of the Institute, music and pyrotechny combining to create a very pleasing and brilliant effect.

In another part of the University Buildings there was an exhibition of models of machinery and other articles. Most of the exhibits were Belgian or otherwise continental, but none of them contained any features of marked originality. MM. Gillan and Dujardin, of Leeds, exhibited their system of three-high rolls; and their model, being very ingenious and well constructed, was the cynosure of much attention. The principle, however, is an old one, although there is some originality in the details of MM. Gillan and Dujardin's system. At the last meeting of the Institute, held in Glasgow, a paper was read on a system of three-high rolls that had been in successful operation for a considerable time in America, and which appeared to be much more simple and easy than the system of which the above gentlemen are the patentees. A model of a new form of blast-furnace, patented and exhibited by M. Buttgenbach, was in many respects the newest thing out, so far as the experience of our English ironmasters are concerned. The patentee is pledged to read a paper on this furnace, but I may anticipate his remarks by explaining that an arrangement for washing the gases, and thereby securing a better heat, is its most remarkable feature. A horse-shoe main goes right round the furnace, thus allowing of tuyeres on every centre. A furnace, built on Buttgenbach's system, has been in regular use in Germany for the last seven years, and has yielded admirable results. It is, however, much more complicated than the English form of furnace, and whatever its economical results might be, it only requires a glance to tell that it is very liable to get out of repair. The number of exhibitors of scoriæ bricks and sand encourages the hope that ironmasters are at length fully determined to effect the utilisation of their waste vitreous products.

Mr. Wood, Engineer of the Tees Ironworks, Middlesborough, exhibited his slag-making machine, alongside of which he showed samples of its work, which demonstrated that it was not a merely theoretical and untried invention. The same gentleman had on the table a model of a machine for granulating iron, respecting which he is to read a paper at this meeting. Mr. Wood's paper will bear chiefly upon the economical preparation of the iron used in the Danks puddling machine, and he will adduce data to show that the use of this granulating machine will obviate the employment of cupolas, and save in the cost of the iron made from the Danks machine from 10s. to 12s. per ton. One could wish to see some more substantial proof of this great economy than Mr. Wood's limited experiments enable him to adduce. But as the machine is not expensive it is likely, if found worthy, to become largely adopted. Reverting to the subject of utilising slag, Mr. Bodmer, another English engineer, showed some specimens of compressed slag bricks made by a system recently patented by him. Although Mr. Bodmer's system differs essentially from that of Mr. Wood, it seems to have the essence of practicability. He takes the slag as it passes from the blast-furnace, and passes it through a pair of plain rolls running at differential speed. From these rolls the slag issues in the shape of scale, the thickness of which can be varied at pleasure. The weight of the bricks thus produced is calculated at 3 tons per 1000, and about 8 cwts. of lime are mixed with every 52 tons of slag. The time has now come when ironmasters are compelled to solve the problem of utilising in some form or another their mountains of scoriæ. In the North of England alone over 3,000,000 tons of slag are produced every year. All this immense quantity is now perfectly useless, although containing chemical and metallurgical ingredients which, if they could be properly extracted, would make it very valuable. In Silesia and other parts of the Continent slag has been utilised to advantage for brick-making and other purposes. Its complete utilisation in England appears to be only a question of time.

On Tuesday the proceedings commenced at nine o'clock, the Salle d'Emulation being the place of meeting. Mr. BELL presided, and in his opening remarks he alluded to the magnificent hospitality that had been extended to the Institute since their arrival in Belgium, and suggested that the papers and discussions should be made as short as possible, in order to enable the arrangements made by the Belgian reception committee to be carried out in their entirety.

The following papers were then read:—

ON THE RISE AND PROGRESS OF THE IRON AND STEEL INDUSTRIES IN BELGIUM.

BY JULIEN DEBY, C.E.

A celebrated countryman of yours, Mr. Layard, whose researches have brought to light so many very interesting facts in connection with the state of the arts and sciences of antiquity, has proved beyond a doubt that, at a period when both the Briton and the Belgian were little better than barbarians, the Assyrians and other eastern nations knew how to manufacture iron. Relics, 2600 years old, are in existence to tell their own tale in this respect. In those times of the "very long ago," the western inhabitants of Europe, few and far between, were hunters and herdsmen, and had never heard of either bronze or iron as materials for their rude tools and domestic utensils. We are, however, very ignorant of the state of things in this country prior to the arrival of Julius Cæsar. Archæological discoveries of quite recent date, still unpublished, seem to indicate that at the period of the great Roman conqueror's invasion iron had already been made in Belgium, while it was yet unknown to the inhabitants of the British Islands. The oldest records we have consist in vast deposits of cinder, which cover many acres of ground, and are situated at Niew Rhode, between Louvain and Aerschot, in Brabant, as well as at Tessenderloo, in the Antwerp campagne, where they generally occupy the top of the many ferruginous hillocks of that region. The discovery of these relics is due to Mr. Piot, *sous archiviste* of the Government. Along with these accumulations of iron cinder are found flint arrow heads and fragments of coarse pottery, characteristic of the earliest dawn of civilisation, and which must have belonged to the old pre-historic workers of these deposits. At a later period, and during the Roman dominion, iron was produced in very many places in Belgium. Immense heaps of cinder are to this day scattered in many parts of the country, and several of these are being profitably worked in the neighbouring blast-furnaces. Houses are being pulled down, hills levelled, valleys dug up in pursuit of this precious waste of the ancients, this cinder being remarkably rich in iron. The present inhabitants of the localities where these cinders are found call them *crogats a*

cendres de sarrasins, or slag of the Saracens, this being a vague denomination which was applied to Pagans in general, a race of which, of nomadic habits there can be little doubt, must have existed in those early days, whose business consisted in the working of iron. Our simple peasantry attribute the existence of these cinders to the work of the *Autons;* in the Walloon country to that of the *Alver* or *Halvermannins;* in the Flemish portion of our soil both denominations being synonimous with *Elves* or *Fairies*.

A lucky circumstance has enabled us to gain an insight into the mode of manufacturing iron in these primitive ages. Two old furnaces, yet filled with their contents, were dug in the year 1870 at Lustin, between Namur and Dinant, a full account of which has been published by M. Berchem. A simple oval excavation, with a rounded bottom in a bed of clay, the long axis 12 ft., the short one 9 ft. in length, with a depth in the middle of about 3 ft., the top being level with the surface of the surrounding soil, constituted the whole of this apparatus. A channel excavated in the clay, but covered over with slabs, conducted the wind into the lower portions of the furnace. The opening of this channel was turned in the direction of the prevailing wind, which alone, no doubt, was used as blast, so that iron could only have been made on windy days. The *modus operandi* must have consisted in the piling up of successive layers of ore and wood, or perhaps of charcoal, until the vessel was filled up, and the erection on the top of an immense mound of wood. After a lengthened period of time, the desired end of reducing oxide of iron into malleable iron, without passing through the intermediate state of pig-metal, was effected.

The lower portion of the ball extracted from the Lustin furnaces furnished, when analysed, 93·48 per cent. of iron, 0·37 of carbon, 4·94 of vitrifiable substances, and 1·21 of sulphur, phosphorus, and manganese. The middle portion still contained 38 to 40 per cent. of iron, along with silica, lime, and alumina. During the Roman dominion iron was manufactured in many places, such as Mossée and Halloy, in the province of Namur, in the valley of the Bocq, near Dinant, in the region of Entre Sambre-et Meuse, at Vodecee, at Kehlen, in Luxembourg, and many other spots. In all these localities, as well as in the ruins of Roman villas, grindstones, pottery, and other antiquities are found, along with cinder and iron, which establish the period of their deposition. From this time forward, until we come to the tenth century, little is known of the movements of our ironworks; but concerning this period documents exist which show a prosperous state of our iron trade, and assure us that permanent furnaces built of stone, lined with clay, and elevated above the surface of the country, had replaced the underground affairs of the earlier ages. The *fours*, or *fossoffen*, had replaced the *stuck*, or *wolfsofen*, and remained in use for a long period afterwards. In the twelfth century iron was made to perfection in the Netherlands. In 1345 William, Count of Namur, granted great privileges to the workers of iron, and among them to the furnace of Dames, near Namur, which was at work in 1340. Unfortunately, from the twelfth to the fifteenth centuries little more than political struggles and bloody wars are recorded by the historian, to the neglect of the nobler arts of peace. In 1468 all the works near the city of Liége were destroyed by the soldiery of Charles the Bold, of Burgundy; the city itself was sacked and burnt down, and no fewer than 40,000 of the inhabitants of the locality perished by the sword. This, as may be supposed, gave a momentary check to the industry of this bold and enterprising race. At the close of the fifteenth century leather bellows were in use for driving the blast into the furnaces of the district of Liége. In 1560 no fewer than 35 blast-furnaces and 85 forges were in operation throughout the country. In the year 1635 Philip I. granted special privileges to the ironmasters of Namur. We know that in 1693 a charcoal blast-furnace required 110 labourers, including wood cutters and charcoal burners, that a finery needed 30 men, and a splitting-mill 10 men. Empirism and simple practice were alone known until the middle of the eighteenth century, which corresponded with the end of alchemy, all searchers for the philosopher's stone being at this period liable to imprisonment, or to the more unpleasant infliction of corporeal punishment, as is shown by the edicts, dated 1731 and 1735. Towards the middle of the last century charcoal began to become very scarce and expensive, just as it did in England, and in both countries experiments were made to replace its use by that of coal. On your side Sturtevant and Dud Dudley were the pioneers; on our side the first trial on record was made in 1769, at Julenville; the next was at Bouvignes, where Mr. Amand, in the year 1800, made 12 tons of excellent iron with coke alone, while other works used a mixture of coke and charcoal. In 1827 Octavius de Strada also proposed its use, but failed practically, as did most of those who tried the new fuel. In 1784 Cort and Partnell published their process for converting pig-iron into malleable iron in a reverberatory furnace, and the Abbe Needham, who was at this period director of the Brussels Academy, made many interesting experiments on the same subject, full details of which are to be found in the memoirs of that learned institution. The great French revolution soon after this period cast a gloom over Europe, and spread desolation throughout our mineral region. After peace and quietness were restored things began little by little to recover. In the year 1800 circular blast-furnaces replaced the octagonal ones in use until that period; their height was raised at the same time from 15 to 25 ft., and to the then enormous product of 3 tons per day. In 1817 John Cockerill, your great countryman, who is considered here as the founder of the modern Belgian iron trade, started the works of Seraing, and in 1823 he erected the first genuine coke blast-furnace in this region. In fact, until 1830 this remained the only coke furnace in the province. In 1819 MM. Lejeune and Billard, at Fontain Leveque, created a sensation by the building of a double-acting steam-engine, working to between three and four atmospheric pressures above the atmosphere.

Railroads and capital united now to promote industry in a young nation which had just then broken its bonds, and was inhaling the first refreshing breezes of its independence and free institutions. From the year 1830 until this day our iron industry has regularly increased in importance, and if we exclude a few dark years, such as 1839, 1843, and 1848, few nations can boast of such a rapid progress. In 1836 Namur had 40 charcoal blast-furnaces and one coke furnace, producing 52,500 quintals; 72 fineries, 15 rolling-mills, 7 foundries, and 15 puddling-furnaces. In the same year Hainaut had 4 coke and 3 charcoal furnaces at work and 8 idle, and 19 fineries. Puddling furnaces existed only at Acoz, at M. de Dorlodot's, and at Fuz, at Mr. Dupont's. In 1830 Luxembourg, including the Grand Duchy, which had not then been wrested from us, had 21 furnaces, producing 9200 tons of iron. In 1839 ores were still sold in the province of Hainaut at so much per "cense," which consisted of a pile of ore 4 metres square and 0·75 metres high, and weighing from 11½ to 12 tons gross, and worth from 36f. to 40f. In the province of Namur the "cense" was only 2·65 metres square and 0·382 high, weighing about 3 tons gross, and worth from 5f. to 12f., equivalent to 25f. or 30f. washed ore. All statistics of the first years of the present century must be understood as representing much less than we are now in the habit of supposing. For instance, a charcoal blast-furnace in 1830 produced annually 600 tons of pig, and consumed 800 "bannes," or measures, of charcoal, equal to 10 or 11 tons weight, and worth about 5f. (2l.) per "banne." A coke furnace at this time yielded what was then considered the enormous quantity of 2000 tons of pig per annum, consuming ore and fuel to the extent of 262,000f., or 10,900l. A puddling-furnace, in 1830, generally made 270 tons of bar in six months' working.

Wooden and leather bellows and appliances only began to be replaced in our furnace practice by metallic or marble pistons in 1803, this being a British importation, as had the puddling-furnace of iron been before, as well as grooved rolls for rolling mills, and as was, at a later period, Mr. Neilson's great invention of the hot blast. From this time forward our iron manufacturing went on prospering In 1848 we only sold iron to our near neighbours, as France, Germany, and Holland; but 20 years later, in 1868, with a truly enterprising spirit, we were sending our iron and our rails to America, Switzerland, Turkey, Egypt, Cuba, Rio, Chilli, Spain, the Hanseatic Cities, Denmark, Russia, and even to our only serious competitors in the world's market, Great Britain, to which we exported that year no less than 11,630 tons of iron.

Rather than tire you with a long statement of statistical figures, which will be found annexed to this very incomplete notice, I will limit myself to-day to the enumeration for periods of 10 years, beginning with 1842, of our progress as sydenurgists. In 1842 there were in this district 13 blast-furnaces at work, producing 40,000 tons of pig, and five rolling-mills, manufacturing 21,000 tons of iron: in 1852, 17 blast-furnaces were in operation, producing 81,821 tons of pig, the rolling-mills turning out 37,326 tons of iron; in 1862, 23 active blast-furnaces produced 199,790 tons of pig, and 32 ironworks manufacturing 112,290 tons of iron. At the present time Liége possesses 98 works, including six active blast furnaces, 55 foundries, 17 ironworks proper, 20 machine and special shops, and three steelworks, altogether employing 10,400 men. The product of these works for the year 1872 reached 178,375 tons of pig-iron and 103,245 tons of finished iron. Charleroi has actually 30 blast-furnaces in operation, which last year produced 400,030 tons, employing 3139 men; 43 iron foundries, which turned out 22,028 tons of castings, and employed 1194 men; and 21 ironworks proper, making 250,379 tons of manufactured iron, and having 8315 men at work in them. The grand total for the two districts comprises 186 works where iron is produced or manufactured, employing 29,337 labourers, and turning out 145,911,133f. worth of merchantable iron.

Before closing, allow me to furnish a few dates, which are interesting in many points of view. It was in 1821 that Messrs. Huart and Henrard, of Couillet, in the province of Hainaut, erected the first puddling-furnace in Belgium. But very soon after, in 1823, Mr. Orban, of this city, put up the first in the province of Liége, at his works at Grivegnée.

Our iron industry was saved from complete ruin from want of ores or fuel at three distinct periods of its history. First, when charcoal became scarce and the use of coke stepped in to replace it, Messrs. Huart-Chapelle, Le jeune, at Hourpes-sur-Sambre, and John Cockerill, at Seraing, were in this case the leaders of the movement. Secondly, when the ordinary ironstone of the country had in a great measure been worked out, when, after repeated trials, the owners of the blast furnaces of Ougree, in 1853, discovered how to utilise the vast beds of hematite scattered over the country, and which had not been used since 1790, because they produced cold-short iron. The process consisted in mixing a certain proportion of the shales of the neighbouring coal measures along with the ore in the furnace. Thirdly, when these hematite ores became quite insufficient for our consumption the minettes of the Grand Duchy of Luxembourg came into notice, and are to this day almost our sole resource. With collieries, most of which are worked under very great difficulties, with ores which have to be carried 100 miles or more, with labourers who are physically incapable of doing more than half the work of an English workman, we have by dint of care, order, and especially of economy in minor details, been enabled to hold our own as iron makers among the nations of the earth, and to compete in distant markets with our only great but friendly teacher in this line of industry—Great Britain—to whom we owe a debt of gratitude in connection with this matter. As a proof that we Belgians follow progress, I will state that the first Danks's Rotary Puddling Furnace was put up a few months ago at the works of the Société Anonyme of Selessin, and that the ironworks of Ougree, and of l'Esperance, have adopted throughout their works Louth's three-high plate mills with the most satisfactory results. As regards our steel production I have little to say. The first attempt at making steel dates from 1753, when Louis Joseph Bridimus made some good steel, but at a price which could not bear competition with the Germans. In 1832, other trials were made at Couvin with satisfactory results. In 1856 a company was formed at Couillet for manufacturing steel by the Chenot process. In 1861 Belgium produced 2675 tons of steel, of which 100 tons only was made in Liége. In 1866 the quantity had increased to 3820 tons. Last year, with Siemens' furnaces at Selessin, and Bessemer Works at Seraing, 15,284 tons of steel were made in the province of Liege alone, which was twice the amount made the year before. No doubt can be entertained that this special branch of manufacture will be considerably extended over here. Already the new Bessemer works of Angleur are in full operation, and other establishments are about to be erected.

THE RATIONALE OF THE COMBUSTION OF GASES CONSIDERED IN RELATION TO AN INCREASED SUPPLY OF HEAT.

By Charles Boutmy, formerly a pupil at the Ecole de Liége, July, 1873.

The utilisation of the gases of blast-furnaces is day by day coming more prominently to the front as one of the most important elements in the smelting of iron. Whitwell's stoves, then, seem to have attained to the very highest degree at which the heating of the air is possible, in practice require a very large supply of gas, and their effect will be more powerful in proportion to the more plentiful feeding of a larger number of these apparatus. But we must not lose sight of the production of the steam requisite for the blowing and other engines, and it is the gases of the furnaces also that must supply this power only, as the serviceable effect of the gases is perhaps greater when they are used in heating the blast than when they produce steam, it is of importance to consume them as little as possible beneath the boilers, and, as a consequence, to utilise to the fullest possible extent the number of calories that they are capable of producing. I hold that the complete combustion of a gaseous mixture playing the part both of an agent of, and material for, combustion, in due proportions can be brought about only on condition of the said mixture being raised to, and kept at, the temperature requisite for the combustion of the said gases. The process of combustion, even though commenced, is arrested by chilling the ignited mixture down to the requisite degree.

The two foregoing assertions I found upon the well-known example of a piece of metallic wire-gauze placed over a flame, whereby the latter is flattened, but the gases can be again lighted up above the wire gauze, provided, however, a body in a state of ignition be kept in that position. The wire-gauze is a cold body that puts a stop to any combustion in progress. Gases issuing from chimneys, when subjected to analysis, have disclosed the fact that even at a temperature of 400° centigrade they still retain a notable quantity of combustible gases mingled with a proportion of atmospheric air, several times sufficient to admit of their burning if they were placed in a medium heated to the required degree. Therefore, we are entitled to conclude:—1. That the temperature of 400° centigrade is insufficient to allow of the combination of carbonic oxide and carburetted hydrogens with the atmospheric air.—2. That boilers, the temperature of which hardly exceeds 155° contigrade, produce upon ignited gases passing beneath them the same effect as does wire gauze upon flame, and that all their surface being in contact with the flame extinguishes a portion of it, in such wise that they are wrapped up in a sort of sheet of gaseous mixture that remains unconsumed for want of a temperature sufficiently high in degree. And the said mixture, notwithstanding it is, owing to its composition, perfectly combustible, issues forth out of the chimney without having been enabled to serve any useful purpose. However low we may suppose the speed of the draughts to be, we cannot estimate it at less than 3 metres per second. Consequently, this sheet extinguished from the effects of the contact with the boilers represents a most notable quantity of combustible gases that rush out of the chimney and are wasted. To obviate this waste, it will be necessary to consume the gases in a special chamber of combustion wherein they may at all times meet with a temperature sufficiently elevated in degree to allow them to burn themselves out completely, and to project beneath the boilers the products of combustion only, which in passing on to the spot will carry with them the total supply of heat produced. Although I cannot undertake to show a plan in this place for the construction of this chamber of combustion, and which would, of necessity, have to be modified to suit the requirements of each particular case, yet I may direct attention to the fact that the heat retaining capacity of bricks is fully twice as great as their power of yielding up their c loric; and further, I may state that, according to Newton's law, where any body is exposed to a source of heat constant in its supply its temperature does not on that account rise indefinitely, because the quantity of heat it will receive in equal spaces of time will be always the same, whereas the heat lost by its increases in proportion to the excess of its temperature over that of the medium by which it may be surrounded. Consequently, if we cause the gases to be burnt in a chamber filled with bricks the latter will acquire exactly the temperature which the gases are capable of producing, and thus insure the fullest combustion of the same, while the products of combustion will issue forth out of the said chamber, bearing away with them the whole of its heat.

Under such circumstances, but a very low degree of draught speed will be required, together with large sized flues or fire tubes allowing the gases to stay the longest possible time beneath the boilers. In point of fact, in proportion as the gases give up their heat to the boilers, they will fall down to the lower portion of the fire tubes and will be replaced by hotter gases. Such, in my opinion, are the principles upon which must rest any arrangements having for their object to cause the economical consumption of the gases, and thereby afford a means of utilising the maximum supply of heat that can be produced by any given weight of gas within a unit of time.

Mr. Franz Buttgenbach, Neuss Hutte, Prussia, read a paper "On Buttgenbach's System of Constructing Blast-Furnaces."

Mr. Max Goebel, director of the Colliery of the Chartreuse, read a paper "On Statistics of the Manufacturing and Commercial Movement of Coke in Belgium."

Votes of thanks were passed to each gentleman for his paper, but we reserve our report of the discussions, In the afternoon the members visited the works in the district. In the evening they were entertained to dinner by the members of the Belgian Reception Committee.

On Wednesday morning, at nine o'clock, the Institute resumed its sittings in the Salle d'Emulation. Mr. Bell presided. The following papers were read:—

ON THE ECONOMICAL PREPARATION OF IRON FOR THE DANKS PUDDLING FURNACE.

By Charles Wood, Engineer, Tees Ironworks, Middlesborough.

It will be fresh in the minds of the members of this Institute that at the meeting at Dudley, in August, 1871, in the session of our worthy ex-president, that Mr. Danks brought before your notice his revolving puddling-furnace. The very satisfactory statements made by Mr. Danks on that occasion resulted in a commission being sent out by this Institute to America to examine into the whole question, and the very able report of the scientific investigation of those gentlemen is well known and appreciated by all those who are in any way connected with the iron trade. Some of the few defects pointed out by these gentlemen are—the very large quantity of coal consumed per ton of puddled bar produced, and the destruction to the lining of the furnace when charging with pig-iron. This destruction arises from two causes. Firstly, the pigs are generally broken in halves, and are put into the rotary furnace in charges of about ½ ton each. The melting of this pig-iron is the most serious item to contend against; the pigs lie in the bottom of the furnace impenetrable to the heat; the rotatory furnace cannot be set in motion except with the greatest caution, for fear of the pigs rolling over and knocking the lining to pieces; even with the greatest care half an hour is often spent in preparing the lining for the next charge. Secondly, there is also considerable damage done to the lining of the furnace and the iron produced by the presence of a large quantity of silica, which is introduced with the pig-iron in the shape of sand. To meet these difficulties the American Commissioners proposed to reduce the iron to a molten state before introducing it into the furnace, and, no doubt, at first sight this appears to be the right thing, but somehow or other, from causes I am unable to explain, not having had sufficient practical experience, the yield of the iron and the quality is not so good as when the cold iron is charged; perhaps it may in some way be accounted for by the fact that the molten iron does not take up so much from the fettling, and again, the molten iron not being so long in contact with the fettling, may not part with so much of its impurities. Then again, there is the serious cost of melting by the cupola, which cannot be done much under the following sums:—

	s.	d.
Waste of iron in melting, 4 per cent	4	0
Carrying metal	0	6
Wear and tear of cupola and tools	0	3
Coals and engine-power	1	7
Charging and working cupola	1	5
Coke for melting, including charging, 3½ cwts. at 38s.	6	7
Limestone	0	1
	14	5

Making 14s. 5d. per ton before it goes into the rotatory furnace. These figures are obtained from a cupola running 40 tons per day, and are a fair average cost. It will, therefore, be seen that although the cupola process is undoubtedly a saving over the system of melting the pigs in the rotatory furnace, yet that it is an imperfect and very costly process, and it is with an idea that I have succeeded in overcoming all these difficulties that I have the pleasure of reading this short paper before you. I had the honour at the last meeting of reading before you a paper on the utilisation of blast-furnace slag, and I then showed you my models and system of granulating the slag as it flowed from the furnace, as well as samples showing the perfect manner in which the granulating and cooling is effected. These samples, for the information of the gentlemen here present, I have pleasure in showing again on a small scale. The perfect granulating action of the machine induced me to try its effect upon iron, and I ran the iron straight out of the furnace into the machine, and produced the sample of iron on the table before you: the application of this to the Danks furnace at once suggested itself, and at Mr. Danks's request I tried a larger quantity; this has been since tried in one of the rotatory furnaces at work at the Tees Side Ironworks, Middlesborough, with the greatest success—the charges are brought ont in about 35 minutes, the quality of the iron is very superior, and the yield quite as good as if pigs had been put in, whilst the lining of the furnace is little the worse.

It will be seen that by charging the furnace with the granulated iron the machine can be set revolving at once, thus exposing the whole surface of the iron to the heat, which is at once taken up, and the iron is melted in an incredibly short time. The iron runs from the surface into a big ladle or dam, whence it is tapped out—in the same way as from a cupola—in a small stream into the machine, so as to keep it under control, and avoid all possibility of explosion. A samplo of iron is taken from each tapping to show the quality of the iron in its granulated state; the iron is delivered by the same machine at one operation into iron trucks, whence it can be delivered direct to the puddling-furnace. The action of the machine will be better understood by consulting the drawing. You will observe that it is made in a shape not unlike a rotatory puddler, only much larger, being from 12 to 14 ft. in diameter, and having sides, so as to enable it to contain between 3 and 4 ft. of water. This cylinder is kept in motion by a small steam-engine, and will make from five to six revolutions per minute, according to the size the iron is required to be granulated. You will notice that there are a series of buckets or agitators, which being fixed to the cylinder rotate with it. These buckets or agitators passing through the water, keep the water in a violent state of motion—the water having a tendency always to rush to the bottom—but meeting with the buckets it rolls over in a violent manner. Into this water the small stream of molten iron is run, and is scattered, as it were, in the body of the water, where it is held in suspense sufficiently long to prevent its touching the plates at the bottom whilst in a liquid state, and thus avoids all possibility of explosion. On this point alone rests the failure of all former attempts to granulate iron in water. The buckets, or agitators, also elevate the granulated iron to the top of the machine, where it drops into a spout, and thence into railway trucks or wagons, holding about a charge for the puddling-furnance. In conclusion, I would wish it to be understood that I do not claim the invention of granulating iron as new, as, to my own knowledge, it has been more or less tried during the past twenty years: but what I do claim is the very simple and inexpensive mode of producing granulated iron, and one which will at once offer itself as a practical solution of the difficulties before named, and which is calculated to effect a saving of at least 10s. per ton on the finished iron.

Mr. Wm. Kamp, Chief Engineer at the mines of John Cockerill and Co., Seraing, read a paper "On Winding and Other Appliances for Coal Mining."

M. Soignie read a paper—"Studies Relative to the Improvements whereof the Construction of Metal-Ways is Susceptible."

[These and other papers read at the meeting will be published in future Journals, as space and opportunity offers.]

In the afternoon the Institute visited the works of John Cockerill and Co., at Liége, a description of which we propose to give in a future issue of the Journal.

THE BEDWORTH COAL AND IRON COMPANY.

The members of the South Midland Institute of Mining, Civil, and Mechanical Engineers, with a considerable number of friends interested in mining operations, paid a visit on Tuesday to Bedworth, a small township in North Warwickshire, lying about five miles from Coventry, for the purpose of inspecting a pair of new blast-furnaces just erected by the Bedworth Coal and Iron Company, and also of examining the workings of the colliery. The impression that the coal and ironstone seams of the Bedworth district were poor and fitful, difficult of access, and problematical in fruitfulness, has been dissipated by the energy, sagacity, and industry of Messrs, Addenbrooke and Co., names well known in Staffordshire, who now stand at the head of the Bedworth Coal and Iron Company. Finding an extensive coal and ironstone field of about 500 acres, abundantly rich in minerals of the best quality, and apparently with an inexhaustible supply, the company have just constructed two large blast-furnaces, embracing all the recent improvements and specialities of mechanical and engineering science.

Amongst the members were Messrs. J. Bromley, Vice-President of the Institute; E. B. Martin, inspector of boilers for the Midland Steam Boiler Assurance Society; D. W. Lees, secretary; Edgeworth Gibbons, Walsall, proprietor of furnaces at Deepfields; H. Harding, secretary to Birmingham Exchange; T. Parton, F.G.S., mining agent, West Bromwich; S. Fenn, coal master, Pool Hayes, Shropshire; W. Furnival, mining agent, Willenhall; R. Dodd, ditto, Wolverhampton; J. Parton, jun., ditto, Willenhall; E. Meacham, ditto, Moxley; W. H. Glennie, ditto, Dudley; J. Gethen, ditto, Wednesbury; E. Phillips, Deepfields; J. Fereday, ditto, Lilleshall; J. Biggs, ditto, Wednesbury; J. Clark, solicitor, Willenhall; T. Hawkins, coal master, Moxley; R. Hawkins, ditto, Wednesbury; W. Underwood, agent, Wolverhampton; W. Isaac, Wednesbury; J. Nayler, mining agent, Wednesbury; T. Holcroft, engineer, Bilston; D. and J. Davis, coal masters, Bloxwich; J. Atherton, Noah Parkes, &c.

At Dudley Port the party were met by Mr. P. A. Millward, one of the partners in the Bedworth Coal and Iron Company. On arriving at Bedworth Station the party were conducted by Mr. Millward to an adjoining field, where the facts relating to several coal and ironstone mines were explained. After spending some time in the examination of the plant, &c., the whole body proceeded to the furnaces, the particulars of which were explained at great length by Mr. Millward. These furnaces, worthy of note as being the first erected in Warwickshire, and invested with more than ordinary interest by reason of their marking the birth of a new spirit of enterprise in connection with the coal and iron trade in the Midland Counties, occupy a conspicuous and commanding site on the eastern extremity of the Bedworth Charity Colliery. The furnaces are 50 ft. high, 14 ft. bosh, 6 ft. hearth, and have six tuyeres each. The hearth is raised from the ground between 9 and 10 ft.; and both furnaces are encased in a coating of plate-iron, resting on large columns, and supported by arches, from whence springs the lining; this arrangement dispenses with the old "sows," and is a decided improvement in the science of furnace-building. Another advantage is the non-necessity for the old cumbrous brickwork buttresses, which were always unsightly, and great hindrances to the workmen when cleansing the tuyeres. From the side of the mouth of each furnace runs a large gas main down into a horizontal receiver lying between the furnaces and the boilers, from whence the escape gas is conveyed through heated stoves to the boilers, and utilised in the generation of steam. The result will be an enormous saving of fuel, and the prevention of any flame or smoke escaping from the funnels of the furnaces when they are at work. The lift is constructed between the two furnaces, and so arranged as to supply each with fuel and metal; it is worked by a pair of small vertical engines of 28-horse power. The main engine is about 150-horse power, and is the work of the proprietors, the principal parts having been manufactured at the Darlaston establishment. The fly wheel weighs 16 tons; the cylinder is 8 ft. by 48 in., and the blowing cylinder 98 in. in diameter. The whole of the machinery is enclosed in a substantially-built oblong brick engine-house, on the top of which is an iron cistern 60 ft. by 20, and 3 ft. deep. The chimney, or shaft, is 180 ft. high, with an internal diameter of 11 ft. 6 in. at the top and 10 ft. at the base; it is circular within and without, and rests upon a foundation 24 ft. square. For purposes of steam there are five cylindrical boilers, 50 ft. long and 7 ft. diameter, manufactured by William Horton and Sons, of Princes End, near Tipton. Each boiler is fitted up so as to admit of the utilisation of the escape gases from the mouths of the two furnaces. The whole of the brickwork has been done by Mr. Fisher, of Wednesbury, and the wrought-iron work by Mr. Jesse Tildesley, of Willenhall. Mr. Isaiah Vernon, engineer, Great Bridge, has admirably fitted up the engines under the superintendence of Mr. Millward. It is the intention of the company to utilise the slag on the Wood principle, now only in operation at one place—Middlesborough. By this discovery, what has been hitherto a loss and a source of serious expense in removal from the works, will prove a profit, and yield a considerable annual revenue. Instead of allowing the slag to run into a large hole, as is invariably the case in the Black Country, it will be conducted into revolving drums, and reduced to impalpable powder, with which the very best bricks are made.

The Bedworth Charity Colliery is upwards of 500 acres in extent, and there are six ironstone shafts and two coal shafts now in full working order. It is estimated that each blast-furnace will produce 200 tons of pig-iron per week, the coal and stone for which will be supplied by the colliery. The colliery and furnaces are connected by a railroad, with a loop to the Trent Valley line. The traffic is worked by a locomotive engine named "Chamberlain," in memory of the former owner of part of the estate, and founder of the local almshouses. We understand that the ironstone yields an average of from 43 to 44 per cent. of peroxide of iron.

On leaving the furnaces, of which the visitors expressed general admiration, the party proceeded to the colliery, where a goodly number made a descent into one of the pits, under the guidance of Mr. J. Gorden Addenbrooke, also a member of the firm, and manager of the underground workings. At the time of the visit there were 400 men and boys at work in the pit. A considerable time was spent in the workings, the most interesting features of which are the long inclined roads, the arrangements for dispensing with all horse-power, and the signallings by telegraph. The coals are all drawn to the base of the shaft by machinery. On returning to the surface, the party were invited to a luncheon, kindly provided by the company. Mr. J. Addenbrooke presided, and Mr. Millward was Vice-Chairman. At the conclusion of the repast, the Chairman, on behalf of the firm, expressed the pleasure it afforded them to see the Institute at their works, and he only regretted his brother was not present to assist in giving them a hearty welcome. He was then on a visit to Belgium with the Iron and Steel Institute to see what was being done there, and he hoped the result would be the discovery that they could do nothing better than what was being done in this country. That district, except for its coal and ironstone, was one not likely to interest them very much, still what they had seen was enough to satisfy them that there was some good stuff in Warwickshire. (Applause.) In conclusion, Mr. Addencock gave "The Queen," a toast which was loyally honoured.

Mr. Glennie, of Birmingham, proposed the best thanks of the party to Messrs. Addenbrooke and Co. for their kindness and generosity in throwing open their works for the inspection of the members of the Institute, as well as their hospitality in providing the present entertainment. He dissented from the suggestion that Warwickshire was a little behind in matters of geological interest, and argued that there were many things in that district to instruct and interest them, particularly peculiarities in the formation of the strata. He believed Mr. Parton would be able to show that, geologically speaking, they were in the same district as South Staffordshire, where the ironstone and the coal were similar. Whether they could be strictly correlated, he was not prepared to say, but, undoubtedly, there was much to show that at one time they were the same field. Having alluded to the peculiarities in the working of the coal in that district as another point of interest, Mr. Glennie concluded with a high compliment to the firm, on account of the new furnaces. In his opinion they were the pioneers of the iron and coal industry in that district. These furnaces were the first, but he did not think they would be the last which would be built there, for as soon as it was seen how successfully they were being worked, others would be certain to want to have "a finger in the pie." From what he had seen he concluded that Warwickshire had a bright future before it.

The Chairman briefly acknowledged the compliment.

THE WARWICKSHIRE COAL FIELD.

At the request of Mr. Lees, Mr. T. Parton, F.G.S., read an interesting paper on this subject. He said the Warwickshire coal field had until recently been considered unimportant, on the ground of its

comparatively limited extent. The length of it was 15 miles, running from Tamworth to Wyken, near Coventry, and the total area not exceeding 30 square miles. Like the South Staffordshire coal field, it was enclosed by Permian and Upper Red Sandstone. Along the outcrop of the coal measures from Bedworth, as far as Atherstone, igneous rocks were exposed, composed of greenstone and felspar. In all cases where the coal strata were in contact with these rocks they were altered and metamorphosed. Near Nuneaton the millstone grit formed elevations parallel to the outcrop of the coal measures, which dipped under the Permian strata at an angle of about one in six in a westerly direction. Having given at some length an analysis of the general succession of the formations in the district from Prof. Hull's works, Mr. Parton proceeded to describe the breaking up of the workable coals in the northern part of the coal field, and the appearance of the shale and sandstone, which thinned out southwards. By means of diagrams, he explained that at Wyken this resulted in an aggregate thickness of 26 ft. of coal, which was equal to the "Thick coal" seam in Staffordshire. The phenomenon, he observed, was strikingly similar to what was met with in the South Staffordshire coal fields, where in the north the "Thick coal" was split up into many separate seams, while southwards, near and around Dudley, the seams formed the wonderful Ten-yard coal. The coal in Warwickshire was persistent throughout the whole length of the field, and interspersed with rich and valuable measures of limestones, samples of which they had seen that day. According to the report of Prof. Hull, the resources of the coal field were as follow:—1. An area of coal (beyond the boundary of the Permian rocks to the outcrop of the Seven-feet coal) 30 square miles; thickness of ditto, 26 ft.; original quantity of coal to be raised 627,000,000 tons. From this one-third had to be deducted for quantity already worked and loss upon working, which left 418,000,000 still available. There appeared to be 30 square miles of productive coal measures at a depth of less than 2500 ft.—The paper was heard with evident interest.

Mr. ADDENBROOKE explained that it was a slight error to speak of these furnaces as the first in Warwickshire, for about 40 years ago the late Mr. Wheeldon erected one at the Hawkesbury Colliery, which was only worked for a very short time.

The toast of "Prosperity to the Institute" having been cordially drunk, the party adjourned to the Hawkesbury Colliery, where they were shown over the works by Mr. Tansley.

At half-past five the proceedings closed with a dinner at the King's Head Hotel, Coventry.

Original Correspondence.

THE GAULEY-KANAWHA COAL COMPANY.

SIR,—The extreme importance of the large and well-known coal fields of Western Virginia, first rendered available by the completion of the Chesapeake and Ohio Railroad (which was opened for traffic in the spring of this year), fully justifies you in looking with extreme jealousy on every attempt made to introduce English capital to assist in its development. The Gauley-Kanawha is the first company successfully launched in England for this purpose, and has been vigorously attacked in the Charleston *Daily Courier*, and by your correspondent "Carbon." If successful, it will be followed by many others. If a failure, suspicion will be thrown upon the district.

The Gauley-Kanawha Company propose to open a property situated on a stream 5¼ to 7 miles from the newly-opened railway. The fact of the existence of valuable seams of coal on the property, very easily accessible, may be assumed, as it is admitted on all sides. The conveyance to market is really the only point at issue. I myself visited and reported on the coal lands of the Kanawha many years ago, and am not unacquainted with the difficulties that have ever since prevented the successful working of the deposits. The River Kanawha, New River, the Gauley, and all the creeks, have been hitherto found little adapted for navigation. The navigation has been, and will be improved, but the conveyance of large quantities of coal by water from the mines will hardly be either the most convenient or economical method to adopt now that the Chesapeake and Ohio Railroad is open. Branch lines will probably soon be seen on the Gauley and other principal tributaries passing through the coal lands.

General Imboden, a part proprietor of lands on the Gauley, visiting England on other business, having the highest recommendations, and having shown himself exceedingly well acquainted with the resources of the country, submitted a plan for the development of his property, offering to dispose of it to a company, who should find the necessary capital for working, who should, quite independently of him, superintend the expenditure of the whole of the money raised, who should receive for themselves every profit made up to 10 per cent. on this sum subscribed, and who should only, in return, give to him deferred shares, which are not saleable, and which only begin to receive a dividend after 10 per cent. has been paid on the working capital. No money whatever was to be paid to him in any contingency.

Under these circumstances the price he asked was 30,000*l.* for 1060 acres, or about 28*l.* 6*s.* per acre, in deferred shares, has not been thought excessive. The directors obtained a report from Mr. R. L. Maury, which, coupled with the known facts recorded concerning the coal fields of the Kanawha Valley, they regarded as sufficient basis on which to form the company. They also received a letter from General Imboden, in which he undertakes to contract to carry the coal from the mines to the rail at 1*s.* per ton.

At the same time the General wrote to Mr. M. F. Maury requesting a report on the property, and asking that gentleman if he would desire to act as consulting engineer. In reply to this a report and two letters were received by General Imboden from Mr. M. F. Maury, but the report arrived only a few days before the company was launched. As the company had been organised, and the prospectus prepared on the faith of General Imboden and Mr. R. Maury's statements, this report, which generally confirmed them, was not published, but left in the office to be referred to. Copies are now forwarded to you for publication, and the originals may still be seen at the company's office.

No report whatever from Mr. M. F. Maury has been received by the secretary or any officer of the company, with the exception of that above alluded to, and none of the directors are aware of the existence of such report. If sent to the company's offices it has never reached its destination; if addressed to any other person, that person has not communicated it to us.

Allow me next to point out that if, as stated by the editorial in the *Courier*, the timber has been removed from the more accessible lands near the river, and if the improvement of the river should be more difficult and costly than General Imboden calculated. We still have left the chance of the railway company constructing a branch line on a guarantee of freight, or at the worst the construction of a light wooden tram and a bridge to the rail. In either event, and with good management, we might hope to obtain some share of the vast traffic that must shortly take place in coal in these countries, and pay a dividend on 20,000*l.* without any serious shock to the mineral interests of Virginia.

That coal can be opened and worked to a profit in a country where the price rules quite as high as in England, and wages are little higher, where the seams are thick, nearly horizontal, and worked by free level, the coal of excellent quality, the roofs and floors good, and the whole ground well adapted to the use of the coal-cutting machine, where iron ore is abundant and near at hand, and iron is protected by heavy duties, and where the only suggested difficulties consist of an interval of half-a-dozen miles of flat land, and a river 300 or 400 yards across, will seem to most enterprising Englishmen, and to most Americans, very fairly probable. The assumption need not, at any rate, disgrace those who have fancied that the absence of a heavy first price in cash was more important than the difficulties of transit. In conclusion, I venture to suggest, as within of limits of possibility, that the owners of coal lands in and near the Kanawha, may, perhaps, be annoyed at seeing at example set that they are not inclined to follow. If the owners of one property are willing to accept deferred dividends instead of ready money, it may not in future be easy to obtain money in other cases.

The indignant determination "to squelch the concern at once" may possibly not be due entirely to pity for "shareholders doomed in advance to certain disappointment." The directors are now in communication with the Chesapeake and Ohio Railway Company for the construction of a branch, and they are taking measures to prepare for the opening of the mines. Some time may elapse before these plans are completed, but they have no fear of ultimate success. I hope to be on the spot myself in the autumn of this year, and in that case shall be happy to inform you of the progress of affairs.

8, *Duke-street, Adelphi, Aug.* 19. D. T. ANSTED,
Chairman of the Company.

P.S.—Since the above was written a letter has been received from General Imboden, a copy of which is forwarded for your inspection, and which may be seen at the office. The directors are still without Mr. Maury's second report, which does not appear to have been addressed to them as stated in the letter of your correspondent. General Imboden states that he is taking measures to obtain damages from the editor of the Charleston *Courier* for a libellous article published by that journal. D. T. A.

The following are copies of the only letters from Mr. M. F. Maury in the possession of the company and of the only report of which they have any knowledge. The copy of the offer made by General Imboden to put the coal on the railway at 1s. per ton is also forwarded:—

General I. D. IMBODEN, London.

Charleston, Kanawha County, West Virginia, May 20, 1873.

SIR,—Enclosed please find the map and report you wished, which I hope will answer your purposes. Before I left the land I requested Colonel Imboden to have the thick seams on Lick Branch better opened, so that I could judge of the quality of the coal. I go up on the 24th, and will report on the 26th inst. The 60 acres of William Simms, on Back Creek, was gotten by him as a cattle range, and could, no doubt, be very cheaply bought, if desirable, by your company. You will notice what I have said about land for miners' houses, &c. This is a necessity, as the survey has not a bit of bottom land about it that will answer for this purpose.

Allow me to return you my most hearty thanks for your kindness in bringing my name before the company as their consulting engineer. You ask me in your favour of April 26 what I deem a fair annual salary for two days at the mines every ten or so, and for the preparation of working plans, &c. As two days, together with those spent in travelling to and from the mines, will cut up my time for any other usual business, &c., to a very great extent, I think $1800 per annum just and proper, and for that I will accept the position.*

I have just issued a pamphlet treating of this field very fully. I ask Capt. Imboden to send you a copy, and beg to submit it to your company as part of my report.

(Signed) M. F. MAURY, Jun.

* No such agreement has been entered into with the directors.—D. T. A.

General I. D. IMBODEN, London, England.

Charleston, Kanawha County, West Virginia, May 27, 1873.

DEAR SIR,—As I mentioned in my letter of the 20th inst., I have to day visited the two largest coal seams mentioned in my report on the Imboden and Moody tract, on Gauley. The seam described therein as a 7 feet one, with 18½ in. parting in it, on being driven on so that I could see the quality of the coal, shows coal 3 ft., parting 1 ft. 5 in., coal 2 ft. 4 in.: total, 6 ft. 9 in. Good floor and roof. The upper coal (3 ft.) will be a very hard bituminous, and the lower a mixture of splint and bituminous. All is very free from sulphur. The large seam, above this some 80 ft., shows 6 ft. 6 in. of a remarkably fine very hard bituminous coal. The only semblance of a parting in it is about ½ in. of black coaly dirt, which, after going in 20 or 30 ft. further, will, I think, be mineral charcoal, which does not injure coal in the least. I saw sulphur (iron pyrites) in only a single lump, and there in extremely minute quantities. Of all the seams mentioned in my report this is the most valuable, not only on account of its size and freedom from shale, but by reason of its being so low down on the mountain. Taken altogether, from what is now seen, it is one of the finest exponents of this class of coal that I have yet seen in the Kanawha coal field. (Signed) M. F. MAURY, Jun.

The following is the proposition submitted to the directors by General Imboden:—

To the DIRECTORS of the GAULEY-KANAWHA COAL COMPANY (Limited).

London, June 17, 1873.

GENTLEMEN,—I submit for your consideration and acceptance the following proposition:—That for the sum mentioned in my printed estimate accompanying your prospectus (to invest 403*l.*) I will prepare your mines for working, and, instead of preparing a towing path and procuring ten mules, will put a steam launch on the Gauley to tow the barges. This preparation to be for an annual output of 75,000 tons, or 300 tons per day for 250 days yearly. And for 5150*l.* will prepare for mining and moving to the Chesapeake and Ohio River Railway 600 tons per day, and for the sum of 6250*l.* 900 tons per day. I engage that with the means of transportation thus provided, and put under my control, I will, if it should be found to be inadequate, increase it at my own proper cost and charges, and transport at my expense and deliver on board the coal wagons of the Chesapeake and Ohio Railroad, on its main line, any quantity of coals ranging between 100,000 and 300,000 tons per annum from the banks of the Gauley river, wherever it may suit you best below the mouth of Rich Creek to construct your wharves, for the price of 1*s.* sterling per ton of 2240 lbs., payments to be made monthly, and you permitting me to use coal at will, free of charge, for the steam launch and hoisting engine at the railway. I also to have the privilege of substituting railway carriage in place of the barges, at the same price per ton from your wharves to the main line of the Chesapeake and Ohio Railroad, should a railway be constructed up the Gauley river. This contract to be for the period of three years from its date, but terminable after one year, on two years' notice. I to give security in any reasonable sum for its fulfilment. This proposition is open to acceptance for sixty days.

I. D. IMBODEN, Richmond, Virginia.

To the PROPRIETORS of the GAULEY MOUNTAIN COAL ESTATE.

GENTLEMEN,—The boundaries of this estate, according to a survey made in June, 1871, contain 1120 acres, 60 of which, as shown on the accompanying map, belong to William Simms, leaving 1060 to be reported upon. It lies in the famous Kanawha coal basin, and faces the Gauley river (though it does not touch it); the nearest point is only about 150 ft. from the river. This frontage is some 5½ miles from the Kanawha river. The geology of the Kanawha coal field is of the simplest character. The strata, unbroken by faults or dislocation, dip with singular evenness and regularity to the north-west at an angle of from 1° to 1½°, a circumstance of great value, inasmuch as whatever coal is included therein is kept near the surface, or at easily accessible depth, over enormously wide spaces of country. In 1853, Prof. Ansted, President of the Geological Society of London, made an examination of this coal region. In some of the narrow valleys running back from the Kanawha river, he speaks of 14 seams, of an aggregate thickness of 63 ft., actually proven above water-level, and adds that in no part of the field did he see the smallest indication of faulted ground, or a single slip or trouble that could seriously interfere with coal working, and a more intimate knowledge of this region enables me to confirm this most fully. A report made in February, 1871, by the Engineer Department of the United States to the Secretary of War, states that it is well known to geological men that the veins of bituminous coal which pervade the whole western slope of the Appalachian Mountains have their maximum thickness (50 ft.) of solid coal in the Kanawha Valley, and that this coal field is equal or superior to those of Great Britain or Pennsylvania. Many other eminent authorities speak of it in the same way. The bituminous coals of this field rank with the best from Pennsylvania, as is seen by analysis and various reports from the most excellent authorities, backed by the valuable test and testimony of actual trials.

Furnaces in Newport, Kentuky, Ironton, Ohio and Whaling, West Virginia pronounce the Kanawha splint coal as a most superior article for the manufacture of iron. The firm of Cand. C. Mendenhall and Co., owners of furnaces in the last-named city, writing to the president of the Coalburg Mines (which are about 14 miles south-west of this estate), state that this coal was the finest in the market for foundry purposes, making an iron which brought the best prices given at that time. Cyrus Mendenhall, of this same firm, in answer to an enquiry of J. S. Paxton, a director of the Chesapeake and Ohio Railroad, as to how the Kanawha coal worked in iron furnaces, writes that they have thoroughly tested its quality for that purpose with the most satisfactory results, regarding it as better adapted to melting iron than any other coal of which they have knowledge in the great Alleghany coal field: that they know of no coal equal to it in every respect; that they used Coalburg and Campbell's Creek with about equal results; and adds that "the coal in Mahoming Valley (Ohio), now used in the works of Governor Todd and others there, has hitherto been regarded as of the finest quality known by the works which use it; but our founder, who has managed furnaces in that valley for many years, places the Kanawha coal unquestionably before it." The Kenton furnace, of Newport, Kentucky, has used some 10,000 tons of the Campbell's Creek splint, mixing it with an equal amount of Connellsville (Pennsylvania) coke. Of this mixture it took only 1¼ ton to make 1 ton of pig-metal. It takes the coke of about 3½ tons of ordinary Pennsylvania bituminous to do the same. The great value of this coal is due to its standing transportation with so little loss, its small amount of ash, the decimal percentage of sulphur in it, and because it can be used in the raw state in the blast-furnace, requiring no preliminary preparation, such as coking, &c.

Through the whole of the Kanawha lower coal measures, which are about 950 ft. thick, are strikingly rich, yet there is no one belt pre-eminently so. It is about 20 miles wide, and runs in a north-east and south-west direction. This property is on its eastern edge, and near the eastern reliable limits of the Kanawha splints. The following exposures of coal are to be seen:—About 400 ft. above the level of the Rich Creek, and half-way between the Bridge Fork and Lick Branch, is a seam which used to be worked for local use. The mouth of the mine has now fallen in, so that I did not see it; but the seam and coal are reported good. Nearly a mile from the north of Lick Branch, and some 75 ft. up the mountain, is 2 ft. 10 in. of splint and bituminous. Lower down the branch, and about 150 ft. above it, is another 7 ft. thick, with 18½ in. of clay parting 3 ft. from the floor: 80 ft. above this is 6 ft. 7 in. of clear coal. These last two have not been driven in far enough to speak positively of the quality of the coal, but they will be, I think, a mixture of splint and bituminous. An idea may be had of how easily the coal is got at in this coal field from the fact that the 2 ft. 10 in. seam is laid bare by the water running down a ravine, while the 7 ft. and 6 ft. 7 in. were discovered and opened, so that I could measure them by two men in six hours' work; and the other exposures yet to be mentioned were all uncovered by natural agencies.

About 300 ft. above Gauley, up the first hollow below Rich Creek, under a sandstone roof, is a seam of bituminous coal, having a little splint mixed with it. It is made up of coal 1 foot 6 in., slate 2 in., coal 8 in., shale 1 foot, coal 6 in.: total, 3 ft. 10 in. 10 feet above this, under a shale roof, is another seam, harder and more splinty in character; it is 4 ft. thick, and has three partings of shale in it, each parting 6 in. thick. One-third of a mile from the mouth of Back Creek, and in the bed thereof, is 2 ft. 4 in., all clear coal. The bottom 6 in. is soft bituminous, and the rest is a hard coal, suitable for use in the raw state in the blast-furnace. One-half of a mile from the river, and 12 ft. above the Creek, is a very fine 4 ft. 9 in. seam of a mixture of splint and bituminous; it has no parting in it. Not one of the exposures mentioned showed iron rust on its face, thereby indicating the freedom of these coals from sulphur (iron pyrites), though I cannot speak positively about this until they are driven in a short distance. It is not foreign to the subject to mention that on the other side of Gauley, about 400 yards from this tract, and 300 or 400 ft. up the mountain, is a 5 ft. 8 in. to 5 ft. 10 in. seam of bituminous, with 8 in. parting of slate. It is well proven, having been driven in 100 ft.; also that on this same side of the river on the 40,000 acre Maury survey, various seams of splint, cannel, and bituminous, varying from 11 ft. down, have been opened.

It will be seen from the accompanying map that all of the exposures noted are on the Rich Creek and Gauley fronts. This is because this portion of the land is more readily reached than the rest, while the central and southern portions being some distance from any workmen it was found impossible, save at much expense of time, to search for and open the coal seams there; though, from the great regularity of these measures, there can be no doubt that the various banks noted elsewhere, and on the Maurey 40,000 acres survey, will also be found here when properly searched for. As yet the principal seams discovered are the 7 ft. and 6 ft. 7 in. on Lick branch, and the 4 ft. 9 in. on Back Creek; and one great point in their value is the comparatively small distance they are up on the mountain. The 6 ft. 7 in. seam will give 10,000 tons per acre, which at $3 per ton, selling price in Charleston last winter, would be $30,000, as the value of 1 acre underlaid by the seam. The whole thickness of the lower level measures is here above water level, as the Black Flint Ledge, its upper member, is found near the tops of the mountains, which are 1100 to 1200 ft. high. Below these measures come in another series of coal bearing strata about 1000 ft. thick. The coals in these, as seen in the exposures up New river, are altogether bituminous, of a soft, rich, and very pure kind. They would have to be shafted for; but when it is remembered what a vast extent of fuel is above the water level it will be seen that very many years must elapse before it will be necessary to work otherwise than by day levels.

The land is cut in all directions by deep and narrow valleys, and offers numerous objective points for the coal miner to begin operations. This is a point of no small value when the position of the coal here and in other countries is compared.

In the northern coal fields of Great Britain the shafts are rarely less than 150 ft. deep, and many have the depth of 1800 ft., sunk at an expense in some cases of $1000 per yard. To this must be added the cost of constructing and maintaining proper air-courses, and their accessories requisite to the safety of the employees, and machinery for pumping and hoisting. This great outlay is destined to utter destruction in serving the purpose for which it is used. Here, on the contrary, Nature has sunk all necessary pits, which need neither repair nor renewal. The inclination of the strata, coupled with the laws of gravity, have provided the most perfect, permanent, and costly pumping and hoisting machinery, while the ventilation of this mines and the safety of the miners is a matter of the most ordinary care, as there are none of those noxious gases to be dealt with which render coal mining oftimes so dangerous.

The outlets for this coal would be a narrow-guage railroad down Rich Creek to Gauley river, and thence down that steam to the Chesapeake and Ohio Railroad; or the river, a fine stream 300 ft. broad, might be made navigable to that point, which is 89 and 3/4 miles respectively from Huntington, on the Ohio river, and Richmond, on the James river. Were such communications with that railroad made there are numerous points where coal mines could be advantageously opened on as large a scale as might be desired, but it will be necessary to unite a little more land with this survey, for as it now stands there is no place for the erection of miners' houses, &c., the mountains being too steep and rugged for such purposes. The coal will be shipped to the foot of the mountain over inclines, thence, as I have said, it must reach the Chesapeake and Ohio Railroad by rail down Gauley or by river.

The former plan will necessitate a bridge some 1200 ft. long at the mouth of the New river, while the latter would require that Gauley should be so improved that barges drawing 4 ft. could pass down all the year. From the mouth of Rich Creek to the Kanawha—seven miles—there is an estimated fall of 30. In this distance are seven shoals to get over, for which chutes would have to be made by fixing all the water in the river into one narrow channel, a very frequent thing on these western rivers. It would require a small steamboat to tow the barges hand and forth, as well as an elevator at the Chesapeake and Ohio Railroad to load the coal from the boats into the cars. It is proper that I should here mention that on April 3, 1873, the West Virginia Legislature issued a charter to the Gauley River Railroad Company, which is to run 60 miles up that river on either side, and to connect with the Chesapeake and Ohio Railroad. On Feb. 28, 1872, another charter was granted to the Gauley River Improvement, Manufacturing, Mining, and Lumber Company, giving it the exclusive privilege of improving the river and its tributaries by removing obstructions to the navigation, and by constructing dams, by cutting a canal or by sluices, and to construct booms. So far, the only work done has been to improve the navigation of the river so that logs can come down all the year round from a point some 20 miles from the Kanawha, nothing having been touched below Rich Creek. When the Chesapeake and the Ohio Railroad is reached the Great Mississippi Valley with its 20,000 miles of navigable waters, and its system of 20,000 miles of railroads now in successful operation, which traverse the country of 16 magnificent, populous, and growing states of an area of 1,000,000 square miles, and minister to the wants of 10,000,000 people, opens up to this coal a boundless and ever growing country in the West.

Last year there floated down the Ohio river, past the mouth of the Kanawha, upwards of 60,000,000 bushels of coal to help supply this great demand. Also 40 or 50 miles below this point the Chesapeake and Ohio Railroad taps the Ohio at Huntington, whence coal can be shipped many months in the year when as a low water in the upper Ohio holds back the Pennsylvanian and Northern fine supplies, and this, taken in conjunction with the fact that the Kanawha coalmix with the best from those regions, justifies the belief that they will, ere long, compete heavily with them. This same railroad, which is just completed, and runs to the wharves on James river* at Richmond, also opens up a large eastern market, while all the ores of the rich iron region of Central and South-Western Virginia will have to look to West Virginia for the coals for their reduction, for they are the nearest, besides being the best. In the present great iron manufacturing districts of the United States it costs from $27 to $30 to make 1 ton of pig metal. With Virginia ores and Kanawha coal it will cost $18. The western edge of this iron belt, which is bisected by the Chesapeake and Ohio Railroad, is only about 10 miles from the estate under report. The cost of mining coal in the Valley at this time is 3½ cents per bushel. At Coalburg (which may be taken as an example) it costs 2 cents more to deliver it into the cars on the railroad. To transport it to Huntington the tariff is from 3 cents to 3½ cents (about 1 and 1¼ cents per ton per mile), on l by river to Cincinnati 1 cent per bushel more. In that city the price is 12 to 14 cents per bushel when its coal yards are full; when the Upper Ohio supplies are kept back, as was the case most of last autumn, for this reasons I have before stated, the price ranges from 22 to 30 cents per bushel.

This estate is yet covered with virgin forest, in which abound white, black, red, and chestnut oak, poplar, hickory, beech, chesnut, maple, &c., which can easily be got to the river, and hence the value of the property is much enhanced. In other parts of the Kanawha Valley, not so heavily timbered as this, the Chesapeake and Ohio Railroad, in the spring of 1872, paid 5 cents per cross tie as they stood on the stump. At this price (and they took their pick of the best) landowners have netted from $15 to $20 per acre from that source alone. The enormous size of this magnificent growth is equalled in few other sections of this country, for the trees are not less remarkable for their straightness and freedom from lower limbs than for their great height and diameter; poplar and white oak growing 60 and 70 ft. without a twig, and having diameters of 3 and 4 ft., while the other classes are proportional. To sum up, there are several circumstances in connection with this property very advantageous for the employment of capital. These are—

1.—1060 acres of nearly horizontal coal-bearing deposits of unusual regularity, great thickness, and excellent quality, bounded by a river that could easily be made navigable, and five miles from one of the great east and west railway lines of the United States.

2.—It has numerous seams of coal which, when practically tested from mines in other parts of the valley, rank with, or exceed, as the case may be, the best coals of the United States.

3.—It can have communications with the eastern markets, access to the rich iron regions of the Alleghanies and the Valley of Virginia, and can send its coals over 40,000 miles of western railroads and river navigation, along which are many large and important manufacturing towns.

4.—Not only does it contain this coal, but it contains it above water level, and under circumstances the easiest to mine imaginable.

5.—Coal can be shipped to the west from Kanawha Valley many months in the year, when that from Pennsylvania and Northern Ohio, which now supplies far the largest portion of this market, is kept back by the difficulties of navigation in the Upper Ohio.

6.—It has the advantage over Pittsburgh—the chief shipping port of Pennsylvania—of being nearer to Cincinnati and the other western cities by 217 miles.

7.—It is timbered with virgin forests of magnificent growth.

(Signed) M. F. MAURY, Jun.
Fellow Geological Society of London: Assoc Royal
Dated *Charleston, West Va., May* 20. School of Mines, England: C.E.

* This river is now being cleared out by the United States Government, so as to give 18 ft. of water to the Chesapeake Bay. At present it has 12 ft.

THE GAULEY-KANAWHA COAL COMPANY.

SIR,—In the Supplement to last week's Journal are several violent attacks on this company, of which I am a director, and as there may not be an opportunity of conferring with my colleagues, that we might make a joint reply before you go to press this week, I venture to ask the favour of a few remarks.

These attacks on our undertaking in Virginia are made by Americans who, curiously enough, set themselves up as perfections of commercial morality, defending the British public whom, they say, we English directors have deluded. Happily, to any man of commonsense, the virulence will over-reach itself, and I would treat the whole matter with contempt, proceeding, as it evidently does, from disappointed parties; but the public cannot be expected to feel as easy on the matter as I do.

Personally, I hold General Imboden responsible for all the statements set forth in the prospectus; it was he who introduced the matter to me about six months ago, and nothing has been stated without his sanction and approval. I had the pleasure of meeting General Imboden frequently, and I believe him to be incapable of wilfully making or sanctioning a false representation. Mr. Richd. L. Maury made a report to the directors on behalf of the company as purchasers. Mr. M. F. Maury made a report to the proprietors as vendors; yet he would make out, by his letter to the *Daily Courier*, that he was employed by the company as their consulting engineer, while he was not so employed. The company of course adopted the report of the person they employed, and especially so, as in substance it did not materially differ from the report to the opposite party.

Mr. M. F. Maury's letter seems contrived purposely to mislead; but the facts are these: He did write a report to the proprietors of the Gauley estate—*i.e.*, to the vendors—and dates it May 20, and not May 24, as stated by him. The said report of May 20 is in the company's possession, General Imboden having given it in as a document. In that report of May 20, the only one received from Mr. M. F. Maury, he says "the coal must be carried down to the Ches-

Peake and Ohio Railway either by rail or *river*. He further recommends that the Gauley river be improved; that barges drawing 4 feet of water can pass up and down all the year through. He also recommends that a steam-tug be employed in towing the barges. He tells also of seven shoals, but he also says the river can be easily made navigable, and that coals can now be shipped most times in the year.

From Mr. M. F. Maury's style of writing, I must confess I thought about 100*l.* (one hundred pounds) would have made Gauley navigable throughout the year; but now Mr. F. Maury turns upon us, and supports those who accuse us of having wilfully made a false statement, in saying the Gauley is navigable for barges throughout the year. I will only add, I leave Mr. M. F. Maury to be judged of by reasonable men, and if I can prevent it he shall not enjoy his office of consulting engineer a day longer than it is necessary to get him removed. As for "Carbon," and the "Charleston *Daily Courier*," it will be a question for the board and their solicitor as to the treatment they will receive.

The very nature of the undertaking shows the railway for transport, rather than the Gauley, is what we depend on. The river always has been, yet the minerals could not be got to market. Now there is the Chesapeake and Ohio Railway; so a company is formed, and which will be a great success, notwithstanding this unmanly attack.

J. D. SHAKESPEAR,
A Director of the Gauley-Kanawha Coal Company.

Thatched House Club, St. James's, Aug. 20.

THE COAL TRADE OF NEW SOUTH WALES.

SIR,—As the *Mining Journal* is so generally read both at home and abroad by everyone who is interested in whatever relates to Mining and Minerals (and, *inter alia*, of course, to Coal), perhaps you will allow me to make known through its columns that all Tonnage Dues at the port of Newcastle, in New South Wales, have been wholly done away with. These dues were heavy—so much so as to make it a matter for consideration to shipowners whether or not to send their larger vessels to load there; and their entire removal, therefore, cannot fail rapidly to increase the general trade of the port, and in particular its coal trade, immensely. The harbour of Newcastle is a fine and capacious one, admitting ships drawing 21 ft. of water readily to pass in and out.

AUSTRALIAN.

Aug. 19.

UTILISING WATER-POWER.

SIR,—I have read with considerable interest the correspondence in the Journal in reference to this subject, and having been engaged on extensive lead mines in the North of England, which are worked exclusively by water-power, I would, in answer to "Economy's" enquiry as to the best means of transmitting his water-power over a distance of three miles from his water supply, suggest another method, in addition to that of Mr. Sturgeon's last week, and one that I have seen successfully carried out at the mines before mentioned. Of course, it is somewhat difficult to go into the matter thoroughly, not knowing the nature of the ground to be passed over and the kind of machinery to which the power will be applied. Assuming, however, that an hydraulic-engine, 40-horse power, of a simple construction, will answer the purpose of working the machinery, the best plan to my mind would be to erect a water-wheel of (say) 60-horse power, and attach to it a set of force-pumps to lift an accumulation of sufficient weight to give an effective water pressure of 500 lbs. per square inch. The pipes to the hydraulic engine need not be more than 6 in. diameter. The outlay would probably be in excess to that of the plan suggested by Mr. Sturgeon, but the motive-power would be much steadier, and the cost of maintenance, I know from experience, would be trifling.

With reference to the letter of "Fair-Play," who thinks your Essayist, Mr. Goldsworthy, rather severe in his comments on the "Neglect of Water-Power at Disposal," I scarcely think he is, for in a recent visit to Cornwall I noticed several instances where it might have been applied with advantage. In these days of low prices for tin and copper, and fearfully high prices for fuel, it would be well if mining engineers would give this important question more of their time and consideration.

J. COATES.

London, Aug. 20.

RICH SILVER ORE FROM BOLIVIA.

SIR,—I have just seen some specimens of silver ore in the office of Mr. Spargo, of Gresham House, which have been brought from the mines of Caracoles, Bolivia, the State of all others in South America richest in silver, and probably only to be rivalled by the silver-producing Republic of Mexico, in the northern part of the great continent. Both the Andes and the Cordilleras are rich in silver, and they are but different sections of one great range. I have never seen finer specimens of silver ore than those lying for inspection at Mr. Spargo's office. They are various in their character, but their varieties lie within the richest category. I merely now notice the abstract facts, that mines producing such specimens exist, and that anyone wishing to see these specimens has easy access, as Mr. Spargo will have great pleasure in submitting them to inspection and in pointing out their peculiarities.

High Holborn, Aug. 19. HENRY EDWARD DAVIS.

SILVER MINES IN BOLIVIA.

SIR,—In last week's Journal you inserted a letter from me on the subject of tin, especially as found in the Cordilleras, and in other parts of Mexico. I then stated that the range of mountains stretching from Mexico and other parts of North America, bearing different designations, away through Central and South America, were rich especially in argentiferous treasures. I desire to call your attention to that fact, and through your indulgence that of your readers.

The slopes of the Andes, both towards the Pacific and the interior, are known to be full of minerals. Humboldt, quoted in my last letter as bearing witness to the tin deposits of Mexico, has also given testimony as to the metallic deposits of the South, and especially to the silver-bearing properties of the Pacific States. Bolivia is probably the richest country in the world in silver unless Mexico, or that portion of the United States which once was Mexico, claim equality.

Peru was once known as the silver land, and the fame of Potosi rang through all civilised nations. At that time, however, Bolivia was part of Peru, and the precious region of Potosi was a part of Bolivia proper. Whether it was for the advantage of either of these Republics that their connection was severed, each is rich, and may pursue its separate path by the development of constitutional freedom, education, commerce, and mining exploration and enterprise. Probably there is no mining field in the world more deserving of the investigation of scientific, and the adventure of commercial men and miners, than the district of Caracoles, in Bolivia. The whole region is replete with silver. Rubies are also found, and it is probable that gold exists in considerable quantities. These mines are situated about 70 miles from the Pacific Coast in a direct route, but they are practically twice the distance by the imperfect roads which exist. The Bolivian Government has determined to afford every facility to mining undertakings, and no State can have displayed more spirit and integrity than the Bolivian Republic has recently done. Railways are contemplated, and will be speedily executed, as the credit of the Republic stands high in Europe.

The telegraph system of South America is all but complete; it is the grandest in the world. In a short time telegraphic communication will be open all over South America, so that we may receive news of the working of the mines at Caracoles, not once in six weeks as by the present mail service, but in a time to be counted by hours. The Transandane railways are also connecting the different portions of the Pacific States, such as Bolivia, Peru, and Chili, with the Eastern or Atlantic States. An exemplification of this has just taken place in the Argentine Confederation. A contract is taken, and the capital provided for a Transandane line from a salient point on the territory of the Confederation. One of the grandest enterprises in which rail and river are united has been lately set on foot by the Government of Bolivia, the object being to make an outlet to the Atlantic for her commerce. The project is to pass by the Madera and the Amazon rivers to the ocean.

As the chief river courses lie through Brazilian territory, it was necessary to secure the adhesion of the Imperial Government to the scheme. This was effected, and it appeared to be certain that Bolivia would by this time have free access to the Atlantic through these water courses, but the rapids of the Madeira were the obstacle, and a railway round those rapids was a *sine qua non*. A loan was raised in England to accomplish this purpose, but, unfortunately, the work was more costly than the estimates—no unusual thing—and the progress of the circuitous line is stopped for want of funds. The English investors have lost nothing, as the Bolivian Government has given satisfactory assurances to the Council of Foreign Bondholders that the interest on the debt shall be paid until the works are resumed. When this line is completed silver and silver ore can be expected from the mouth of the Amazon from Brazilian and Bolivian mines. Peru has also an Amazon Navigation Treaty with Brazil, and her products also can be launched upon the Atlantic from the mouth of the Amazon.

Thus there will be every facilility for the products of the Pacific States of South America being exported to Europe. These are facts of great importance in connection with the Caracoles mines.

It is not long ago since the *Times* newspaper proclaimed that these mines would restore the fame of Peru for production of silver when Bolivia was an integral part of the Republic. At the foot of this letter the proportions of silver in the mines and the assay will be given. The first class of these mines was discovered three years ago, and have shown very wonderful results. The newspapers of South America have reported that the production of silver was altogether unprecedented. The Bolivian Trading Company has, by its engineer, investigated the property, and pronounced upon it a high eulogy. A company has been formed to work these mines, and have entered into arrangements of a most favourable nature for their purchase. The following will abundantly testify to the richness of the produce:—

Laboratory and Assay Office, 25, Finsbury-place, E.C., Aug. 13.

Certificate of assays of 15 samples of silver ore, marked "Bolivian," forwarded by Capt. Wm. Bray:—

		ozs.	dwts.	grs.
No. 2, silver	Per ton	2,613	6	16
No. 4 "		7,023	6	16
No. 7 "		4,738	5	17
No. 9 "		3,075	14	14
No. 13 "		6,533	6	16
No. 19 "		718	13	8
No. 19, gossan, silver		269	10	0
No. 9 " "		381	1	3
No. 22, argentiferous galena—lead, 47·5 per cent.; silver		2,229	13	6
No. 2 " " "		7,164	12	8
Average of 15 specimens, as above		3,969	0	0
No. 8, silver		4,156	16	16
No. 18 "		4,753	0	0
No. 20 "		18,309	13	8
Second assay, No. 20		29,330	0	0
This is the average of two assays—gossan from No. 20; silver		7,301	0	0

—W. WHITE, Assayer and Consulting Chemist.

Gresham House, London, Aug. 21. THOMAS SPARGO.

TIN MINES, SMELTERS—CO-OPERATIVE SELF-SUPPORT.

SIR,—I was exceedingly pleased to read in the Journal a letter from Messrs. Tredinnick and Co., announcing that a project is afloat, and soon likely to assume a practical form, to constitute a co-operative company for the purpose of tin smelting, and thereby to improve the present depressed condition of tin mining companies. This is a project which had occurred to my mind as most likely to destroy the monopoly of the tin smelters, which we are taught to believe is at the bottom of the mischief from which we are suffering. I am merely a London shareholder in sundry tin mines, and have no practical experience; but I am sure that if the co-operative company should be started it will be cordially supported by all mining shareholders. I see it is stated that the proposal is to *purchase* tin and tin ores. Would not this, in reality, be merely adding another to the existing tin smelters—would it reform the evil? Would it not be better that the co-operative company should smelt and sell tin for the mining companies on commission; and if this could be done the mining companies might pass resolutions not to sell to the smelters, but to have their tin entirely smelted and sold for themselves on commission by the co-operative company. If the managers of the various tin mines, particularly of the largest mines, were taken into the confidence of the promoters of the co-operative company, with a view to bringing about an arrangement for smelting on commission, when the latter company should be established, and, if possible, for getting their shares taken up by the mining companies, so as to make the interest of both companies as far as possible identical, I cannot but think success would be ensured. I sincerely trust the project will shortly be carried out.

A SHAREHOLDER.

TIN MINING IN CORNWALL.

SIR,—At South Wheal Crofty the products of tin, copper, and arsenic for the three months ending July 5 were 556*l.* (odd), and the costs were 548*l.* (odd)—plus 85*l.*, minus lords' dues, 32*l.* 19s.; compensation for land, 60*l.*; interest and commission, 81*l.*: thus establishing a loss of 243*l.* (odd), a debit balance of 500*l.* existing at the previous quarterly audit. There was no call made, hence the company is indebted about 744*l.*, the number of shares being 937, and at the present time saleable at 30*l.* to 35*l.*, against 110*l.* some year or two ago. The report states that the decline which has taken place in the value of tin in one quarter lessened the proceeds of ores 1000*l.*, while, when compared with the ruling prices only one year since, the loss in assets amounted to 2000*l.*, or (say) 35¾ per cent. on the sum realised, while costs of labour, fuel, and merchandise stand unchanged. In fact, the commercial value has depreciated upwards of 70,000*l.*, and the workings are carried out with a monthly loss, yet the produce at the prices of metals a year back would have afforded the shareholders gains of 750*l.* annually, or over 7 per cent. on 110*l.* per share, and 25 per cent. on the present selling price of the mine. The workings have been carried out with spirit and practical advantage, so far as ordinary foresight could have devised. The shaft is sinking under the 180; the cross-cut at that level will soon intersect the lode. The 170 is standing whole, and scarcely any part of the 160 stoped away, so that the management has accumulated a reserve of 30 fms. of backs to support and add weight and strength to the prospective. The stamping-power has been increased from 40 heads to 84, the whole of which will be at work in a month, and consequently the executive promise a much greater bulk of tin ores for the current quarter.

The only questions at issue are—first, the increased cost of dressing, and next, the market value of the product. Here is a mine that has been practically handled, the shareholders have buckled to and grappled with the costs of highly efficient and expensive machinery, construction of dressing floors and mechanical appliances, opened out the workings in depth, keeping large reserves, and in every respect in possession of a very productive mine, from which there was every prospect a year ago that the enterprising adventurers would now be in receipt of large and substantial dividends. And, pray, allow me to ask—What is the picture now presented? First, there is a losing mine, and there is no working capital, but, on the contrary, a debit balance of 744*l.*, a charge of 81*l.* for banking in the last quarter's audit, the exhaustion of the ores to the extent of 22,268*l.* annually, and to be augmented in the future. Again, the payment of the heavy dues of one-eighteenth to the landlord, who received last quarter about 388*l.*, or (say) 155*l.* yearly. and lastly, with loss instead of profit to the shareholders. There is only one course of action to be pursued by shareholders in Cornish mines if they desire to preserve their capital, and to receive interest on the money sunk in working them—destroy the monopoly, or close the confederation of smelters and bankers, and through the recognition and support of a Co-operative Tin Smelting Company, secure to the miner a fair and remunerative value for his production.

Refuse to pay dues on all ores not yielding gains to shareholders. The landlords should be satisfied with 5 to 7½ per cent. on the actual dividends, and not on the gross receipts. It is a visionary illusion for landlords to expect a commercial public to pay them 80*l.* an acre for 10 to 20 years' purchase of lands not worth 20*l.* in freehold, and to submit to the payment of 5 to 6 per cent. on ores when "yield" is exceeded by "expenditure." The landlords will soon have to open out their own mines if the prices of metals render such veins as traverse South Crofty, East Pool, West Basset, West Frances, South Condurrow, Botallack, St. Ives Consols, Providence, Great Vor, Trumpet Consols, and East Lovel, of no commercial worth from the lamentable depreciation in the value of metals, coupled with the high charges for labour, fuel, merchandise, and machinery. If the shareholders in mines be only true to themselves, act independently of the fondly-cherished and short-sighted "vested interests" of Cornwall (poor, injured smelters!) and constitute a "Co-operative company," then we shall see tin 180*l.* to 200*l.* a ton, and the mines sought after, not only as a remunerative, but also as a favoured investment. For there will ever exist those hazards that will spice the pursuit of the hidden wealth both with interest and adventure to those who follow and support speculative enterprise. There is a better day dawning; money is to be rapidly acquired by those who now select their investments with discretion and take advantage of ruling depression. All will do well to remember that preservation of capital and prospectively advancing interest constitute sound investment.

TREDINNICK AND CO.,
32, *Fleet-street, Aug.* 20. ——— Dealers in Stocks and Shares.

NEW DRESSING MACHINERY—RHOSWYDDOL MINE.

SIR,—Another nameless correspondent has taken upon himself to publish, with "Pedestrian," a string of statements which are very like many of those of his forerunner. I never made unfavourable reflections on Mr. E. Davies in my remarks of August 2. The idea is a production of "Maldwyn's" own imagination, whoever he may be. "Pedestrian" introduced the subject by referring to the once rich Rhoswyddol, which he stated is now getting sadly into the shade. I only fairly commented on the statement by showing the real state of the matter. The idea conveyed by stating the case as "Pedestrian" did was that the mine was once making vast profits and now great losses, which is directly false; and it is equally so to say that I make it appear that myself and friends were duped in the purchase of Rhoswyddol. I neither make it so appear or wish to do. The appearance of the mine was good before the purchase, and had it continued so I dare say all would have been pleased. But neither Mr. Davies nor anyone else has been blamed for the falling off of the produce of the lodes by anyone that I know; and, therefore, this Quixotic champion of the absent has spent so much breath for nought except to show the bias of his mind. One thing that is certainly also untrue is that I "estimated the daily returns of orestuff," which I never did. This was done for me, and I was asked to provide machinery to deal with it. No person having one grain of common sense would suppose that I could, or that it was my place to, make the estimate referred to. The machinery did not absorb nearly the whole available capital of the company, but only the portion that was allotted to it. Mr. Davies did not decline responsibility for the machinery, for he was never asked to take any responsibility. I only am responsible for that. It has not been found perfectly inadequate for the purpose intended, but, on the contrary, perfectly adequate, as can be plainly seen to this day. One part after another has not broken down, neither has it at any time become a perfect wreck, although I must say that the last five or six weeks of working under Mr. Davies's management was all that gross carelessness could do to render it a perfect wreck; but, fortunately, it is not yet, nor is it likely to become, a wreck.

Mr. Davies was not marked out as victim, nor made a scapegoat, to pacify discontented shareholders, nor was he held responsible for other than his own acts. "Maldwyn" has heard of no failures in the machinery at Darren, Bodcoll, or Esgairmwyn; everybody who have made themselves acquainted with its working admit that it is a perfect success, and those who have required machinery for the same purpose, after a careful study of the principle, have adopted it, and with such results as the numerous testimonials received show as most satisfactory. At Pen'allt alone the system did not succeed, because there was practically no ore to dress. The information I have of the former company is as good and better than either "Pedestrian" or "Maldwyn" have of the present. It was worked for 30 years by Mr. Davies, with what result all know. Surely the one will not endorse the other's assertion that Mr. Davies said over and over again that if it had not been for the machinery profits would have been made long before. He (Mr. Davies) never made such a statement at all in the proper quarter, but always to the contrary. He could not possibly tell such a deliberate and meaningless falsehood. I am not generous enough to admit that which is false to be true. Until now I was not aware I had told my friends that Rhoswyddol was paying its way at the time they took it over, because I never knew, and do not know, more than this, that the present company paid several months arrears of wages, for which they got a little ore, which realised some part but not more than half the amount; but let me add what is also kept back, the mine was then producing good ore, far better than any that has been seen since it has been in the hands of the present company.

It is untrue to say we are receiving royalties for machinery in use ten years before our earliest patents. "Maldwyn" slaughters himself by the statement. If so, why did not Mr. Davies protest against its adoption at Rhoswyddol? If the results were as stated, this must have been known before the dressing-machinery was placed there, and should have been condemned at once, as ten years experience was a sufficient test for any practical purpose. But it was nowhere placed previous to Rhoswyddol, and up to this time there is no mine from Rhoswyddol to the east coast of England, the northern boundary of Yorkshire, or the south and west of Cornwall, that has such machinery, or that will treat ores so efficiently or economically, and I put the two scribes to the proof for the contrary. "Maldwyn" has not got it on good authority that the ore ground is much the same now as when Mr. Davies left—that is, not in sight or available for working; for the fact is, there was not, practically, a single fathom of ore ground left standing and open when he left the mine, which Capt. Joseph Roberts and all the miners, together with myself and the present agent, can testify, and fully four months' work was required for opening and finding even a little ore to dress. And then as to the "nice little profits" which I hope to see let this fact suffice: we are dressing some 18 or 20 tons a month, and in doing this our machinery saves some 35*l.* per month in the dressing labour cost, and probably 1 ton of ore; these two together form no inconsiderable item in such an output, and make just the difference between profit and loss. This would be multiplied in proportion to increased output, and with 80 tons per month would effect a saving sufficient to pay a moderate interest on the entire capital of the present company. This is the actual result of my "endless mechanical blunders," and every statement here made can be proved and established on incontestible evidence, such as cannot leave a shadow of doubt; and as to saddling innocent mining agents with my blunders, mechanical or otherwise, I have no desire to do anything of the kind. I will take the full weight of the responsibility properly belonging to myself, and the venom, spleen, and falsehood so apparent in "Maldwyn" and his colleagues, shall in no way prevent me doing my utmost to remunerate the shareholders both of the Roswyddol and Mineral Dressing Machine Company, and this I am happy to do by supplying machinery both cheap in the first cost and suitable and durable in construction, having for its object the saving of labour cost, and not endless repairs, but, as far as good work and materials go, the entire avoidance of the same, which my customers give me credit for.

And finally, the Boring Machine "Maldwyn" enquires about: surely one so well informed of my doings could have told all about it. He, however, notwithstanding he has so little to say on this head, has with his usual aptitude managed to get in an untruthful statement. I never made a noise about it; but when Mr. E. S. Crease received a prize medal at the Cornwall Polytechnic I protested against it, and I then and still hold his unliquidated contract to pay me substantial 800*l.*, I suppose for my mechanical blunder. What has become of it, says "Maldwyn?" Why it has lain by ever since, and may so remain for aught "Maldwyn" or his friend can do to bring it into use; but if eventually I do so I dare say these gents will be ready with the assertion that it was done 10 or 20 years before.

And now let me impress upon "Maldwyn's" attention the following:—That he is required to furnish proofs of the assertions he has made. 1st. That the patent machinery has absorbed nearly the whole of the available capital of the company.—2nd. Its breakdown at the mines of Bodcoll, Darren, and Esgairmwyn, with proofs of all other assertions he has made in his letter of last week, and especially—if he is

not ashamed of writing deliberate falsehoods—to append his real name thereto. In conclusion, I beg to thank these people for bringing myself and the dressing machiney so prominently before the public, a thing which, of myself, I should never have done; but am sorry that subjects of quite another sort have been introduced which required the full and flat contradiction I have given. Someone has well exclaimed, "Oh! save me from my friends."

Aberystwith, Aug. 18. GEORGE GREEN.

IMPROVEMENTS IN LEAD DRESSING—RHOSWYDDOL.

SIR,—It seems "Pedestrian" cannot by any chance guess right. I made no splenic attack, but merely a defence. He had no permission to visit the mine. None but myself had authority to give permission, except the managing director, and Capt. Roberts assures me he never did permit anyone, and says the visit must have been as I first stated, or not at all. It is almost impossible to tell what "Pedestrian" is driving at, and I shall not follow him through the matter he has introduced, but simply notice one or two things. I asked him who told him the statements he has made. He answers, it is not my business to ask. Now, I ask whose business it is that "Pedestrian" has in hand?—certainly not his. I put the question, that I may have told him he had been wrongly informed, because he, in the first place, stated he was in company with a superstitious guide. I would ask "Pedestrian" what has either the richness or working of the mine to do with the dressing machinery. He speaks of insinuations—he has nothing else to say. Just a word or two as to his facts, as he calls them: I say absurd fallacies.—No. 1. Is it a fact that Rhoswyddol sold in one year 5500*l.* worth of lead? I answer that with a lode worth on an average, as is stated, 4 tons to the fathom, and with an output of 80 tons per month, there ought to have been a great deal more.—No. 2. Is it a fact that there has been ore sold during the last three years to that amount? I answer possibly not; but what on earth has that to do with the dressing machinery?—No. 3. Is it a fact that their elaborate dressing machinery has cost more to remodel, renovate, and erect than the ore it has dressed will pay for? I answer No; it is as far from being a fact as an untruth can be, for it has saved in dressing alone more than double its entire cost, which money has been spent in the mine, and had the mine been as rich as formerly during the time the elaborate machinery has been in work it would have saved the company in labour and ore more than the entire output of the best year of the time when the lodes produced so largely; and I can tell "Pedestrian" where the same machinery is doing more than this in half-a-dozen places. All this he could have learned in the first place had he been anxious for the truth. I expect "Pedestrian" will be going in for the abolition of railways next—unfortunately, they have been too long in use, and he will find on further enquiry that there are too many mines already using the elaborate dressing machinery, and reaping the advantages thereof, which will be an effectual barrier against the possibility of his random assertions preventing the ultimate univeral adoption of the system of dressing metallic ores, so far perfected at Rhoswyddol—and I must now wish "Pedestrian" good-bye. GEORGE GREEN.

MINING IN MONTGOMERYSHIRE.

SIR,—It was not my intention when writing my remarks under the above heading to provoke any controversy, but simply to draw the attention of capitalists to an extensive and, undoubtedly, valuable tract of mineral ground lying in an almost neglected state (principally through the almost inaccessible state of the roads), within easy reach of the many, and yet comparatively unknown and neglected. But I find that to traverse a mining district and give an unvarnished account of what you see, is worse than putting your foot into a hornet's nest, for the knowing ones, who have feasted and fattened upon the riches of the land, sweep down upon you like an avalanche if you even think, much less have the audacity to express an opinion as to their *modus operandi*.

Such, then, is the present state of affairs with "Pedestrian," who, having expressed a few and most mild remarks, has been construed into everything but a genius, and after having every epithet tolerated in moral language hurled at him, is left on the field for a perfect ignoramus.

Well, Sir, we will see who this oracle—"Samuel Y. Dunn"—is, that, with a flourish of trumpets as to "his great experience in the art of dressing lead and other ores by the automatic system," so suddenly makes his appearance amongst us, and also, if possible, divine the motive that has actuated him to appear on such an auspicious occasion, when I had already two antagonists to contend with. Who? A certain pedagogue who has had greater experience in teaching the young idea how to shoot than he has of lead dressing, and which onerous post he left for the more important position of sub to a certain Mr. Green. Now, it is plain who he is. We see his motive; and also get an explanation of the appearance of such voluble and disinterested letters.

I will not attempt to follow Mr. Dunn through his almost interminable letters, but simply notice what appertains to the argument first commenced upon.

First, then, while admitting that the floors were misconstructed at first, and making the resident engineer the scapegoat, he denies that they have been either renovated or remodelled. Here Mr. Dunn is either prevaricating or he displays a total ignorance of facts, as can be testified to by any who know the past history of the mine, for I will tell him that the floors have been remodelled within the last twelve months. As to his parody upon the "lue and gogrfach" we shall presently see how far such treatment of an old and, to them, faithful servant is justified.

Then again, we hear that "Rhoswyddol at one period of its strange and eventful history" sold enormous quantities of lead ore, which was all swallowed up by "the almost unintelligible and bungling operations at surface." In fairness to the late manager, Mr. E. Davies, let us take a retrospective view of the past, and we shall find that in those days of great riches and (so-called) dressing that Rhoswyddol ore, with all its "bungling," realised an equal, if not a higher, price than the neighbouring mines, and well it might when it took nearly all that it was worth to dress it, I suppose Mr. Dunn will say. But let us see what ore they did sell in those days, and here we find that the greatest quantity ever sold by the Rhoswyddol Mine in one year would not realise on an average a sum of 450*l.* per month for the twelve months, and with this insignificant sum to pay a heavy working cost, they at this time having a great deal of preliminary work to do, such as several adit levels and cross-cuts driving, new roads making, floors erecting, &c., we find that Mr. Davies was able to pay "one half-crown" dividend, therefore the idea that the average value of the lodes was something over 4 tons per fathom could only have existed in the (if not unpoetical) at least unprofessional and expansive imagination of Mr. Dunn's father. "But a change comes over the spirit of the scene," and Rhoswyddol, "with the present improved appliances for the transit and treatment of its ore-stuff, and only making about 30 per cent. of the former returns, with a much larger (smaller) proportion of miners, &c., are making a small monthly profit." On what? The mine alone, or the mine and patent floors combined? The former I doubt, but the latter—; well, we will see. Rhoswyddol during the last eight months has sold about 80 tons of ore, or an average of 10 tons per month: the average number of miners employed has been about 35, irrespective of trammers, &c.; thus, then, without even looking at the voracious patents, and leaving the agency quite out of the question, we find that the "little profit" lies the wrong side of the ledger. So much, then, for the much vaunted engineering management and machines that leave a "small profit."

We have also, as further proof of the superiority of the patent machines referred to, the Great Darren and Gertrude Mines. I have never been at these mines, neither have I seen it recorded in your Journal that any ore has ever been sold from them. Query—Has the price obtained for it or the quantity been so small, that they were ashamed to publish it? As further reference I will ask Mr. Dunn whether he ever heard of a Pen-y-Cefn, and whether the "lue and gogrfach" were used there or not; also a Pen'allt, where the machines made the ore so clean that the smelters would not sample it, and whether the "lue and gogrfach" were not here again called into requisition? Also, how long have the "lue and gogrfach" been discarded at Rhoswyddol—will the months count so many as he has fingers?

It must not be inferred from the above that I am anyways an advocate for the retention of such ancient weapons as the "lue and gogrfach" upon our floors; far from it, but it struck me as very strange, knowing what a useful ally the "lue" had been to the "patents," that directly they were able to do without them a whole hue and cry should be raised to exterminate them for ever from our midst. I shall hail with pleasure the appearance of the promised "tabulated comparison of the cost of dressing by the old and new systems."

I see nothing worth replying to in Mr. Dunn's second letter, for it must be obvious to all your readers, Mr. Editor, who have taken the trouble to read his long effusion, and in which he seems to act as mouthpiece for Mr. Green and himself, that they are already stuck fast in the mire, and each spasmodic kick they give only helps to sink them deeper, and therefore, lest such geniuses be irrevocably lost, I refrain from making any further comment on this letter at present, but simply advise him "that people who dwell in glass houses had better not throw stones." PEDESTRIAN.

MINING IN MONTGOMERYSHIRE.

SIR,—"A drowning man clutches a straw." I will, therefore, begin where "Cyrmo" leaves off. Poor fellow! what an invidious position to be in—when, from lack of other matter, he is obliged to attribute to others what in reality he himself feels, as, by this, it must be obvious to all your readers, Mr. Editor, that "Cymro" had not a leg to stand upon, when he commenced the attack; and, although we have had a string of "Would you be surprised to hear's," coupled with such things as "miracles," giving "death blows," &c., the two simple questions on which the argument was based cannot be answered; but it is thought a certain Mr. Green may be able to give the said information. What a blissful state of verdancy, to be sure! Doubtless, "Cymro" has ere this seen that I have already supplied one gentleman with that "bit of news," and I may tell him that I have yet a little to spare; therefore, "Cymro" was quite right in accusing me of withholding part of the truth; but not for the ignominious purpose of misleading your readers, Mr. Editor, as he would have them believe.

There is one remark in "Cymro's" last letter which certainly deserves notice, for he writes—"There has not been an ounce of the Rhoswyddol ore cleaned by the 'lue and gogrfach,' for many months, or years, for what I (HE) know." Are we to infer from this, "Cymro," that you are really ignorant of how things are carried on at Rhoswyddol? Would not, then, the advise you so kindly gave me be very appropriate to yourself—"Seeing is believing?" And now, "Cymro," as you have refused to take up the gauntlet thrown down to you, and another champion (Mr. Dunn) having entered the "lists" to defend the rights of the patent dressing machines, like the best of friends—we must part. But before doing so, let me advise you, before you again enter the arena of public controversy, be sure you have ground to stand upon; and, while giving you the credit of being a good "quill driver," I doubt very much, from the tone of your letters, whether you ever handled a "lue" or "clenched a gad" in your life. PEDESTRIAN.

Aug. 14.

MINING IN MONTGOMERYSHIRE.

SIR,—May I ask the favour of a place in the columns of your valuable Journal for the few following lines on Mining in Montgomeryshire, Improvements in Lead Dressing, Rhoswyddol Mines, &c.? I have read with deep interest "Pedestrian's," and other letters in reply to his, and have much pleasure in bearing testimony to the great good "Pedestrian" has conferred on sound legitimate mining by the publication of his very interesting description of the mines of this county. Mr. S. Y. Dunn would have all the readers of "Pedestrian's" letters believe that they are misled and misguided followers of his. There is an amount of so much self-sufficiency in these remarks that I do not care to notice them further, but will at once come to the point which, I believe is, or has been, uppermost in "Pedestrian's" mind—whether good management of mines consists in erecting an expensive range of patent dressing machinery before it is ascertained by the prosecution of the underground operations what monthly returns the mine is capable of producing? Your correspondent "Maldwyn" infers this to have been the case at Pen-y-cefn, Great Darren, Bodcoll, Esgair Mwyn, &c., and if this system were generally adopted, I do hesitate to assert it would tend to put an end to sound legitimate mining. I say nothing of Mr. Green's patent dressing machinery; I believe it to be very good, and well adapted for the purpose. What I do say is this—spend the money underground, and make sure that you have the material in sufficient quantities to warrant the expenditure on patent dressing machinery. It will be obvious to any of your disinterested and unbiassed readers that "Pedestrian" eulogises more than otherwise the Rhoswyddol dressing machinery, and I cannot possibly understand why Mr. Green should attack "Pedestrian" in the way he has done unless it is he considers his patent dressing machinery were not sufficiently advertised. I trust "Pedestrian" will not be deterred by any such insidious attacks from continuing his excellent letters, for it is evident he is not that blind ignoramus that his traducers would have him be, and from his remarks it is plain to all who know the country that he has not only seen but has made the best possible use of his eyesight; and while thanking you, Mr. Editor, for allowing such valuable information to appear in the Journal, I must again express a wish that "Pedestrian" will continue to send you the result of his travels in Montgomeryshire, as it will be conferring a great boon to many of your readers beside MAGLONITE.

"MALDWYN," AND MR. GREEN'S MINES AND MATERIALS.

SIR,—May I beg space in the Journal for the following remarks on "Maldwyn's" letter, in last week's Supplement? Mr. Davies might be able to defend himself in England; but he failed to do so in Wales. Whether Mr. Green and his friends were duped or not, I will not undertake to solve that problem; but I am sure Mr. Davies had done well by the transaction. No doubt Mr. Green was repeatedly underground before the purchase, and there were good bunches of ore discovered above the day levels; and all the ore that would pay for working was concentrated to 3 ft. or 4 ft. wide, while the stoping was carried 10 ft. and 12 ft. wide, and having all the stuff run and trammed out wholesale into the dressing floors rendered economical working out of the question. It does not matter what Mr. Green advised his friends before the purchase. He had nothing to do with the management of the mine. It is clear to me that he had recommended Mr. Davies to the management—in fact, Mr. Green was told not to go underground repeatedly by Mr. Davies. One thing is quite certain, that Mr. Davies had to estimate the daily returns of orestuff, and Mr. Green accordingly had to provide adequate machinery to deal with that quantity, which was to extract about one-fifth more ore from the orestuff and at three-quarters less cost than could be done by any other machinery then in existence. I must say it was a bold undertaking, and we all looked upon the scheme with suspicion—nevertheless, when put to the test they were adequate for doing more work than calculated; they have ever since been at work, and are in as good condition now as ever. If they were in operation anywhere in Great Britain ten years before introduced at Rhoswyddol, Mr. Davies would have gone and seen them at work, because he was over-anxious to see them in practice, in order to judge of their merits; but I do not hesitate to say they were not in the kingdom.

The machinery did not absorb nearly the whole of the available capital. Capital was subscribed according to the engineer's estimate for the construction of machinery, which was more than enough for their completion. Capital also was subscribed to open out the mine according to the manager's estimate, which was spent by Mr. Davies, and, to give him every possible chance of success, he has had over 5000*l.* more than the amount of his estimate. Then he had the chance to defend himself in Wales, but his eloquence failed him in the face of his own figures. There was no scapegoat wanted to pacify the discontented shareholders, neither was Mr. Davies marked out as a victim. Mr. Davies has had every facility that money could afford him, but he could do no good by it—consequently, an alteration was necessary, which took place by changing the management. As regards failures following the machinery in question, it is absurd and ridiculous to have made such remarks; and, in defence, I do not hesitate to undertake the dressing of 30 tons of stuff per day with this machinery, at a cost not exceeding 2*d.* per ton, and would run it night and day without breakage or damage until it wears out, if my life should be spared long enough. I have had as much experience in the dressing of ore as most people, with all sorts of machinery in use during the past thirty years, and I find when the self-acting machinery is once set going the trouble and vast expense of dressing ore is at an end.

If "Maldwyn" is a miner he had better go to Mr. Green for mining machinery and material, and if he would occasionally try to obtain a lesson or two in the engineering line it might do his employers some little good in a financial point of view. A gentleman who has worked himself into such a position by his own merits cannot be so very careless a mining broker after all, and the next mine "Maldwyn" has to dispose of he had better offer it to him, because he will be very likely to purchase it at the current price of the day. I advise "Maldwyn" not to repeat what he hears over and over and everywhere, for such cannot but lead him into hot water. If he wishes to get at the facts let him see for himself, judge for himself, write for himself, and defend himself in Maldwyn (Montgomeryshire), and not go to England to do so. W. A. R.

IMPROVEMENTS IN LEAD DRESSING—RHOSWYDDOL.

SIR,—I have watched with considerable interest the discussion carried on in the Journal for the last few weeks respecting the Rhoswyddol dressing floors, with its patent machinery, and, knowing a little of the mine and its history, I was certainly rather surprised at the contents of Mr. Dunn's letters in answer to "Pedestrian," wherein he states—first, that "the patent self-acting dressing machinery has not been renovated or re-modelled since their first erection. This to all who live in the vicinity of the mines must be news indeed; and the question naturally arises, what have all the engineers, fitters, carpenters, &c., we have seen at the mines during the last three years been about?—Second, "That the mine under the old system was so heavily burdened by the enormous cost of dressing that it absorbed all the profits." I knew Rhoswyddol when it sold about 50 tons per month, and, in comparison to the number of tons sold bi-monthly or quarterly, now I cannot see that the number of hands on the dressing floors have been so materially diminished. I fully expected Mr. Green would this week have furnished us with a reply to "Pedestrian's" query in his last letter, as to the actual cost of dressing the ore at Rhoswyddol past and present, including cost of machinery. We might then form an opinion as to the real merits of their new "patent self-acting machinery" certainly, if they have attained to such a prodigious state of perfection as Mr. Dunn in his intermination letters would have us believe, and which our worthy patriot, "Cymro," designates "as the greatest boon to mines and mining the present century can boast of." It is high time that we should have some particulars about them. I was greatly disappointed at the non-appearance of Mr. Dunn's promised "tabulated comparison of the cost of dressing 1, 10, or 20 tons of lead ore by the old and new systems" in his last letter. A NEIGHBOUR.

BRONFLOYD MINE, AND ITS MANAGEMENT.

SIR,—My letter which appeared in the Journal of Aug. 9 it seems was not very pleasing to "A Shareholder" or Capt. Davis, otherwise they would not have replied to it in the manner they have done: the statements in their letters are irrelevant, or based on erroneous assumptions, therefore I shall pass them unnoticed. Perhaps "A Shareholder" will not object to answer the following questions as to the erection of the machinery at the mine, because it may be the means of enlightening the public a little on science:—1. How many times were the patent jiggers fixed and removed before they were put in their proper position to receive the stuff direct from the crusher? What did this cost the company?—2. How many sets of riddles, shafting, cog-wheels were made, fixed, taken down and refixed, before the stuff could be conveyed from the crusher to the jiggings? How much did this blunder cost the company?—3. What number of bricks were brought from Westbury Station, near Shrewsbury, for the purpose of building slime-pits, so that the work should be so substantially done as not to allow the silver to escape? and what did this cost the company?—4. What number of sheepskins were placed at the outlet of the slime-pits so as not to allow the silver to escape into the river? and what profit has the company realised on this?—5. How many scores of yards of mason walling was built up, pulled down and rebuilt? what was the waste in materials and loss to the company?—6. What has been the cost in the erection of Mr. Dingy's Patent Pulveriser? and what amount of profit has the company received on this?—7. What has been the cost of the wire tramway to convey from 20 to 25 tons of ore per month to Cwmbwa storehouse? and what percentage have the company received for the capital invested?—8. How many steam-engines were purchased as an auxiliary for pumping and drawing in the drought and frosty seasons of the year? at what cost, and where are they now? It was stated at a meeting of the shareholders, held at the Victoria Hotel, London, in January last, that the accidents to the crusher cost the company from 1300*l.* to 1800*l.* Allow me to contradict this statement; the whole thing could be put in order for 50*l.* When "A Shareholder" answers these questions I will let him into some of the secrets of Nant-y-Crib Mine, management. Did there not a letter appear in the Journal on or about the end of September, or in the beginning of October in last year, signed by John Davis, in which he says he has carefully surveyed the mine, and estimates the reserves of ore to be 74,000*l.*? which I consider to be a good round figure; and he goes on to say in his report for the meeting in January last, when he first took charge of the mine he found in some of the bargains very rich ore ground, which he valued at from 3 to 4 tons per fm. However, after a few weeks' working, all this valuable ore ground was cut out. Who can rely on such statements as these? But assuming that his statements be correct as to the reserves of ore being 74,000*l.*, why not break it down and send it to surface, because it seems ridiculous in the extreme to keep from 50 to 60 miners employed to return from 20 to 25 tons of ore per month out of such enormous reserves. Let any practical mining agent analise Captain Davis's annual report, in which the price is given for each fathom of ground broken, and the value of the ore in each fathom of ground since he has had charge of the mine up to the present time, and for every man to get 1*l.* per week in the prise stated, which is about the average gettings of the county, from 55 to 60 tons of ore ought to be brought to surface monthly. In looking at this state of things, one might imagine that Captain Davis does not understand the price for breaking a fathom of ground, or the value of ore in the rock, and, for my part, I consider him just like a man at the bottom of a deep mine, groping his way out to find daylight. During my slovenly and unminer-like management (as Capt. Davis terms it), I returned from 25,000*l.* to 30,000*l.* to the shareholders in dividends, and could do it again; but Capt. Davis has failed. THOMAS KEMP.

Ponterwyd, Aug. 21.

SLATE QUARRYING IN ANGLESEA.

SIR,—My attention has been called to a letter in last Saturday's Journal from "A Festiniog Slate Quarry Proprietor" under the above heading, referring to the notice of the formation of "The Llanllewyn Slate and Slab Quarry Company (Limited)" (as extracted by you from the prospectus), and appearing in the Journal on August 9, wherein he states there "are two fallacious statements which in the interests of the parties about to form the company," he thinks, "it well at once to correct."

Without doubting the sincerity of the writer, it would have been more satisfactory to myself and the other parties interested if he had given his name, and been more particular in quoting the statements he considers fallacious verbatim as they appeared in the article in question. The first statement in the notice under review is—

"The slate rock is a fine-grained argillaceous variety of shale *or clay-slate of a dark blue colour, and is that known to geologists as the Lower Silurian formation*, being similar to the Festiniog class (Lord Palmerston's quarries), *which display the greatest number of quarries, and* in which formation the proportion of cleaved rock to the general mass attains its maximum."

Your correspondent, however, omits all the words which are printed in italics, and then goes on to say *(inter alia)* that—

"In Anglesea no rock similar to this formation is found, though there is plenty of cleavable argillaceous shale, which is not true slate, as there is also in the neighbourhood of Festiniog, that has already been the cause of very serious loss to all who have worked it. *Verbum sapientiæ satis est.*"

If "fine-grained argillaceous shale" is not "true slate" I shall be glad to know what is, and in what the difference between the two minerals consists, and, with regard to this, *verbum authoritatis* will be the most acceptable. On referring to Webster's Dictionary I find "shale" is described as "indurated clay-slate," whilst "slate" is defined to be "an argillaceous stone for covering buildings."

Dana in his work on Mineralogy says—

"Roofing slate is a fine-grained argillaceous variety of shale, commonly of a dark dull blue or blueish colour, or somewhat purplish. To be a good material for roofing it should split easily into even slates, and admit of being pierced for nails without fracturing. Moreover, it should not be absorbent of water either by the ordinary or edges, which may be tested by weighing after immersion for a time in water; it should also be pure from pyrites and everything that can undergo decomposition on exposure."

"Facts are stranger than fiction," and, notwithstanding your correspondent's assertion that no rock similar to the Silurian formation "is found in Anglesea, though there is plenty of argillaceous shale, which is not true slate," I will state that the argillaceous shale in the Llanllewyn Quarry estate possess in a high degree all the essential requisites enumerated by Dana in good roofing slates, although the preliminary trials and workings have not yet extended below 30 ft. from the surface. It may surprise your correspondent to learn that samples of slate from Anglesea have been produced at the Penrhyn and Port Dinorwic Quarries and placed by the side of others, raised at each from a depth of upwards of 100 yards, and pronounced by the workmen who examined them to be superior in quality, colour, and cleavage to the productions of both those quarries at their lowest depths.

Your correspondent would seem to object to the fine-grained argillaceous shale of the Lower Silurian formation in Anglesea being stated to be "similar to the Festiniog class," as he goes on to remark most positively that—

"The member of the Silurian strata in which the only valuable Festiniog slate quarries are found (Lord Palmerston's amongst them) is a comparatively small deposit extending from the Arrenig Mountains on the east, where it begins, to Moelwyn on the west, where it dies out. In Anglesea no rock similar to this is to be found," &c.

I should like to know from whence he derives his authority for this statement. If it be from any old geological map or treatise then I need do no more than simply suggest a careful perusal of the article on "New Mineral Fields" in the *Mining Journal* of Saturday last, from which he will learn that old maps are not to be depended on, and that any new map will have to be frequently altered, as "discoveries of large and important mineral fields are being constantly made." Perhaps it would have been more correct, in alluding to the Lower Silurian formation in Anglesea, to have used the word "superior" instead of "similar," by way of comparison, in reference to the Festiniog class, as surface indications already tend to show it to be within the range of probability that the Llanllewyn slate will prove to be stronger and more durable than that in the Festiniog range, and that its qualities might not be inaptly described by the term "Excelsior." Your correspondent asserts—

"The second misleading statement is at the end of the notice, and refers to the size of the slates made and the probable profit. In the Festiniog quarries the larger sized slates, 18 × 9 upwards, are found to be profitable; slates below that size are considered to be of little value, and as is the make of those larger sizes in proportion to the smaller, so is the profit of the quarry. Such being the case, and as at the Llanllewyn Slate and Slab Quarry the slates made range up to 20 × 10, I feel the confident anticipation that the dividends will be at the rate of at least 20 per cent. per annum is the sanguine outburst of a fervid imagination, rather than the well considered result of a practical knowledge of slate quarrying."

Now, I believe the fact is that there is the greatest demand in the market for Ladies' slates—16×8; and that for the larger sizes the demand diminishes as the size increases. It is true that the profit per thousand may be greater on the large than on the small sized slates, but it does not necessarily follow that because slates below 18×9 cannot be produced out of the Festiniog quarries at a profit it is impossible to make even 20 per cent. profit out of them at the Llanllewyn Quarry, where the cost of production and delivery on shipboard will be materially reduced.

It must not be forgotten that this is a new quarry, and your correspondent, who claims to have a practical knowledge of slate quarrying, will perhaps admit that slate can be worked in galleries on the open quarry system at much less cost, and with less waste of valuable slate rock, than in underground chambers, as at Lord Palmerston's and other Festiniog quarries; that, as an ordinary rule, quarries are sunk for depths varying from 45 to 150 ft. without producing large sized slates, and, in some instances, a single slate; that in a newly-commenced slate quarry the material is viewed under the most unfavourable conditions, as the proportion of mercantile slate to waste is at a minimum; that as a quarry increases in depth the side and foot joints of the slate rock diminish, whilst the size and quality of the slate improve, and that the best slate is found in the lowest workings of all quarries, resulting in the past profits being small when compared with the results obtainable from more extensive operations. As, therefore, slates up to 20×10 have been already got at Llanllewyn Quarry within 30 feet from the surface (which, as far as I have been yet able to ascertain, has not been effected at any other quarry in Wales), proving beyond doubt that the superficial shivered rock—entailing the first and most important, and, in the majority of quarries, a very large item of expenditure—is small in bulk when compared with other quarries; and, as 40*l.* per cent. dividends are stated to have been made on shares in the Dorothea Quarry in the Nanttle Valley, where 45 ft. was sunk with only a few slates got occasionally, it needs not "the sanguine outbursts of a fervid imagination," but it is quite compatible with the "well considered result of a practical knowledge of slate quarry-

ing" to estimate that profits at the rate of at least 20*l.* per cent. per annum will be realised by the Llanflewyn Quarry, with its more advantageous position and natural resources, and that the dividends on the amount of capital judiciously expended cannot fail to rank as high and be as permanent as those of the best-paying quarries in Wales.

THOS. SYKES, Sec. to the Company.

West End Park, Harrogate, Aug 19.

THE VIVIAN (CAMBORNE) FAMILY.

SIR,—Few names (not even the Smiths) are more common in the parish of Camborne than that of VIVIAN of which Captain Joseph Vivian, of Reskadinnick (late manager of North Roskear, and the present manager of North Crofty, South Condurrow, and other mines), is an honourable member. I believe that his ancestors from time immemorial have been regarded as honest and respectable, and none could have been more so than Capt. Joseph Vivian aforesaid. I have known him about 30 years as a man of the strictest integrity, and a highly intelligent and ingenious mine agent. He was the manager of North Roskear for a period of 40 years. During a former portion of that period 110,000*l.* was paid to the company as profits on the working of copper ore. Subsequently the copper having failed, as in the neighbouring mines, and given place to tin, calls were necessarily made to provide machinery, dressing-floors, &c., requisite for tin dressing. For some time—several years—the old company (the original adventurers) readily responded to the calls, but when new (bad) blood was infused into the company by brokers a change of management was called for, and, to the disgrace of the parties concerned, Capt. Vivian was removed therefrom without any sufficient reason, and, I may add, without the slightest benefit to the company. They never had a more capable manager than Captain Vivian, assisted by his son, Mr. W. C. Vivian, nor can they have. Instead of asking him to quit the position he so long and honourably held they should have presented him with a substantial testimonial in recognition of his long and faithful service. Many testimonials have been given where less deserved.

In his old age the selfishness, if not wickedness, of some of his neighbours has brought him and his youngest son, Mr. Joseph Vivian, jun., into some trouble. It appears that the late owner of the Tehidy estate—Lord de Dunstanville—agreed to grant Capt. Vivian a life lease of Reskadinnick, and the flour-mill there, on condition that Capt. Vivian expended 300*l.* in improvements. Instead of limiting the expenditure to 300*l.* he has actually expended 3000*l.* in buildings, improvements, &c. Whether the lease has been granted (executed) or not I cannot say, but I fear not, and the bases for my fear are on the following circumstances.

With the flour-mill the stream of water wont to work it was, of course, granted too. That stream is commonly known by the name of the Red River. For some years Capt. Vivian has had a tin stamping mill worked by a portion of that stream, the remainder, if any, going to the flour-mill. Two or three or, perhaps more, years ago Capt. Vivian took a license or lease to dress the detrital tin carried down in the valley from the numerous mines adjacent thereto, paying out of all tin returned 4th dues, or "dish," to Mr. Basset, the present owner of the Tehidy estate. All the valley, from Capt. Vivian's up to South Frances is occupied in like manner and on like terms, if I am correctly informed. For working and dressing the "stuff" the water of the Red River was necessary, and he used it accordingly for that purpose. But a man called Hocking took a piece of the valley close by Capt. Vivian's, and he, too, wanted the water, which Capt. Vivian did not choose to part with. It has been supposed that one or more of Mr. Basset's agents are concerned with Hocking as partners. Whether this is so or not I will not take upon myself to assert, but from the great interest taken by them in an action brought by Mr. Hocking against Mr. J. Vivian, jun., I am inclined to think that the report is true. The case was taken to the last Bodmin Assize for trial, but referred to Mr. Kingdon as arbitrator for decision. He will hear the witnesses about six or seven weeks hence. At the present time the case is open.

If Mr. J. Vivian has no documentary lease, or cannot show a written agreement for a lease, he may fail on that ground to establish his right to the stream. In that case the present owner may say that Mr. Vivian had the mill and stream on sufferance or during pleasure. I hope, however, that Mr. Basset, who has a character for honour, will not allow any technical objection to Mr. Vivian's title to take effect against him. The great outlay in the improvement of the residence and farm at Reskadinnick should be considered.

Crowan, Charlestown, Aug. 18. A TRAVELLER.

MINING IN SHROPSHIRE—PERKINS BEACH.

SIR,—I have recently visited the Shropshire lead mines, and have been favourably impressed with the prospects of this mine. There is, however, some local distrust and mystery as to its future development. I venture to trouble you with these remarks in the hope that some reader of the *Mining Journal* may be induced to explain the real state of affairs, and tell us whether the present depreciation in price is due to mismanagement and indebtedness, or to the bankruptcy of a director. Suffice it to say the shares have latterly been offered in shoals, and at such prices as to cause one to shrink from them as from a plague. Without a more vigorous and careful management, I fear I see the elements of dissolution. CELT.

London, Aug. 20.

MINING IN SHROPSHIRE—PERKINS BEACH.

SIR,—Can any reader give me some information respecting this mine and its prospects? I am told one of the directors and principal promoters of the company has recently found matters rather too heavy for him. Some time ago there was an attempt made to form a new company, under the name of East Tankerville, by separating a part, as I believe, of Perkins Beach sett. If I am wrong in my conjectures, I shall be glad to be corrected; but I believe there is gross mismanagement somewhere, and a misrepresentation of the true affairs of the company.

A LONDON SHAREHOLDER.

WHEAL KITTY (LELANT).

SIR,—May I ask through the Journal if the large sum of 1388*l.* 2s. 2d., referred to in the circular issued to the shareholders on May 7 last, as due from Capt. Thos. Richards, means that amount paid to him as purser, and misapplied, or due from him in any other way? It appears from that circular that 186*l.* more is due from him in unpaid calls on his shares. This can be understood; but how any further sum of such dimensions as 1388*l.* can be due to the shareholders from the purser, and not be available as a dividend, is past comprehension. Perhaps the liquidators may kindly let us know what steps, if any, are being taken to realise this amount of 1388*l.* 2s. 2d., some months now having elapsed since, in appearance, that money should have been in the shareholders' pockets, or else paid to the credit of the company, in liquidation of outstanding merchants' accounts.

ONE INTERESTED.

NEW ROSEWARNE MINE, AND ITS MANAGEMENT.

SIR,—Having noticed in last week's Journal a letter referring to the management of this mine, I beg the favour of stating, through the same medium, that the entire letter is nothing but falsehood, which is well known to those who know me and the mine best. If I would have connived at carelessness, and even wrong, in a certain party, no such letter would have been written. I shall not refer in detail to the contents of such imputations. If the writer will give his name, and fairly investigate the matter, I will prove every statement positively false. Numbers of inspectors and visitors have been at the mine; strange that none of them should have discovered such mismanagement.—*August* 20. JOHN JAMES.

TREVARRACK MINING COMPANY.

SIR,—Since I communicated with you last week I have seen the latest official report. The manager states that the new north lode is a very fine-looking one, and, from its appearance, he has every reason to expect it will prove productive in depth. The attention of the shareholders cannot be too strongly called to the value of their property. As to the shares selling at 2*l.* each, that has nothing whatever to do with the real merits of the mine. It is evident that if, instead of buying high-priced stocks, the public would only direct their attention to such investments as this, large sums of money would be made. What is wanted at Trevarrack is vigorous working. Let the property be fully developed, and I shall be much mistaken if the shares which have recently been selling at 2*l.* each are obtainable at 5*l.* Any man of the slightest judgment would arrive at the same conclusion if he investigated the matter, and it is from want of consideration that such chances are allowed to pass by. I understand that there is in progress a plan for the reconstruction of the property under the Limited Liability Act; therefore, there is an additional reason why the security should be looked after by the investing public. I shall probably trouble you with further communications, and I think I shall be able to remind you with considerable gratification of my recommendation of Trevarrack. There are other low priced investments to which my attention has been directed, and which have been selling in the market at very high prices in times gone by; they are now almost given away, being entirely neglected, nobody thinking it worth while to notice them. Perhaps I may, with your permission, mention some of them on a future occasion. LEX.

THE BENSBERG MINING COMPANY.

SIR,—"Shareholder," writing in the Journal of last week, says—"Somebody is at fault, and wants stirring up," and, no doubt, "Shareholder" is right. When this company commenced working, about two years and a half since, it was said that sinking was of the greatest importance to the welfare of the undertaking, and accordingly a shaft was commenced, with the object of draining the mine to a greater depth, and hence increasing the returns; but I see, from the manager's report of Aug. 2, that the shaft at that date was only "58 feet deep," and that is from surface. Surely, this is slow work. When is the mine to be laid open to a 50 fathom level at this rate?—*Aug.* 15. ANOTHER SHAREHOLDER.

THE EMMA MINE—MR. PAFFARD.

SIR,—It is difficult to know whether Mr. Pafford, whose letter appears in last week's Journal, is to be condemned for his attempt to impose upon the common sense of the shareholders in this mine more than for his dense ignorance of either the topographical position of the mine or its geological formation. From his own lamentably circumscribed stand-point he appears to have gauged the mental calibre of, and also the information possessed by his co shareholders, for with a modesty peculiar to himself, he tells us he "knows more than the majority of his brethren," and notwithstanding this consummate knowledge retains his interest as a shareholder, although he knows "the mine will never pay another fair dividend." Those unhappy mortals who have much less knowledge than Mr. Fafford would, under such circumstances, sell their shares.

It would be an idle waste of time to give instances in which a formation like that of Emma, a chamber of ore of equal to that from which such results have been obtained, may be opened upon any day, if, indeed. ore has now already been discovered, and of course, equally useless to point out to such a profound individual that in the locality of the caved chamber there is yet large quantities of a high grade ore to be extracted.

The apparently philanthropic efforts of Mr. Pafford to prove to his benighted fellow shareholders that the mine "will never again pay a fair dividend" may, perhaps, to the inexperienced be difficult to comprehend, more especially when they see that to prove this assertion this self-abnegating patriot has put himself to the expense and trouble of printing and advertising a pamphlet at a cost considerably exceeding the amount paid for his five (!) shares, which is the substantial interest he holds in the Emma Mine! Does this would-be modern Crichton imagine for a moment that, in addition to his other mental attributes, he possesses the questionable qualification of being able to hoodwink his fellows? Can even a strongly-enveloped self conceit thus entirely becloud all the yet remaining common-sense of this patriot of ours? Is he still contemplating addressing General Schenck or Baron Grant? Probably not, judging from the reply he once received from the former and the silent contempt of the latter. Does he want to be rendsred famous by causing those whom he attacks to commence an action for libel? If this be his object let his friends, in justice to him, at once come forward and persuade him to direct his attention in another direction, as he has not brought forward a single point that has not been discussed, re-discussed, and disposed of, therefore his emanations do not possess even the merit of originality.

Aug. 18. AN EMMA SHAREHOLDER, OF MORE THAN FIVE SHARES.

THE EMMA MINE.

SIR,—Will you once again favour me with a little space in your valuable Journal to say a few words on what has really become a nuisance in connection with the above company? I am a shareholder in this mine, which, as the public generally know, is a *bête noir* to those who invested in it with the hope of getting large dividends regularly paid. The annoyance of having one's money lying idle, or selling out at a ruinous loss, is certainly vexatious; but not so much so as the annoyance of being pestered with Circulars, both anonymous and otherwise, containing what I dare say the authors think good advice. Most of these Circulars come from one individual, and he actually holds the whole of five shares in the company; but he is a public accountant, and probably trying on a little of the "unjust steward's" practice, in the hope that should the company have to be wound up some of the creditors and shareholders will try and give him a job to get rid of him. I have just received a Circular from S. J. Paffard, of Wandsworth, whose principal object in issuing it seems to be to tell me that I can obtain, for thirteen stamps, post free, "The True History of the Emma Mine," written by himself, in eight chapters and sixty pages; and he gratuitously throws in "An Appendix," containing "Correspondence between the Author, General Schenck," &c. I am very much obliged to Mr. Paffard, and have already read his book, which I was asked to review: I did so in one word—"Bosh."

Now, I know the Emma Mine, and all about it, perhaps as well as Mr. Paffard knows the ins-and-outs of "44, Tonsley hill. Wandsworth;" and I should advise him before writing any more "true histories" to study the matter a little more perfectly than he has, to visit the locality he is writing about, and not to jump at conclusions. I told you in my last letter that I knew it would be a great "strain on the mountain" to pay the dividends on such an amount as the mine was placed on the market for, and I should not certainly wish any shareholder to "catch at a straw;" but they can only show some little confidence in the "committee of investigation," which they themselves elected, and believe that the affairs of the mine are better than these "Circular authors" would have them think. As regards the new lode which has been discovered, I myself received a private telegram from a friend in the locality of the mine on Saturday last, which more than confirmed what the directors had already made public. It would be an easy and not very expensive matter for a few irate shareholders to join together, and share the expense of obtaining reliable information for themselves from the other side of the pond, and it would be much better if they were to do so instead of wasting their substance by publishing a lot of furious "balderdash," which nobody cares to read. It is beyond all dispute that Mr. Attwood has discovered a new pocket or a new lode, and it now remains to be seen what that discovery will yield—Circulars and "true histories" will much increase or decrease its value. "Unity is strength," and the shareholders ought now to show their confidence in the directors and committee of investigation, by supporting them *nem con.* against the base and groundless insinuations of Mr. Paffard and others of his class. F.

London, Aug. 20.

FLAGSTAFF, LAST CHANCE, AND TECOMA.

SIR,—As the steady and persistent "bearing" of the Flagstaff, Last Chance, and Tecoma Mines seems to call for some united action on the part of the shareholders I would strongly recommend that there should be no further lending of scrip. I must confess to having lent my Flagstaffs, tempted by the high rates offered by the "Bears," but regret much that I should ever have done this, seeing the result I have thus assisted in bringing about, and this, too, in the face of the most satisfactory accounts that we have ever had from the mine. If the shareholders will only join in a common action against the "Bears," and refuse to lend their scrip, as I have done this account, the result cannot but be to make a marked change in the value of the Flagstaff stock within a week. I trust this advice may be generally followed out by my fellow-shareholders, so that those who have been depressing the stock without the slightest cause may get the reward they so richly deserve.

August 21. ONE WHO HAS WITHDRAWN HIS SCRIP.

[For remainder of Original Correspondence see to-day's Journal.]

TYLLWYD SILVER-LEAD MINE.

The reports received regarding the progress made by this property are most satisfactory and encouraging. The operations at surface and underground are being pushed on with all possible speed and economy, and the lodes—three in number—as they are opened upon fully realise the expectations formed as to their ore-bearing capabilities. The branch going south from the middle lode is from 2 to 3 feet wide, producing splendid lumps of lead ore. The surface erections are approaching completion. As soon as the machinery (which will all be driven by water-power) is at work returns of ore can be regularly made. Public opinion in the neighbourhood is unanimous in thinking that the directors have secured for a trifling sum one of the finest lead-mining properties in Cardiganshire, and should that success which appears at present so certain attend the enterprise, it will largely benefit the county by giving an impetus to mining.

A well-known authority on Cardiganshire mining, writes:—

"TYLLWYD MINE extends from Gellireirin Mine about a mile west, and has the lodes, three in number, running through the grant for nearly that distance—viz., 1 mile. The mine has been worked by means of a series of adit levels from the summit to the base of the hill, and about 10 fms. under the deep adit level. The hill rises from the deep adit to the most easterly workings to a height of nearly, if not quite, 800 ft., so that when the adit level shall have been extended under these workings it will leave a back of whole ground of more than 120 fms. for stoping. It has been worked, undoubtedly, for some centuries past, and the immense quantity of refuse from the workings, and from the refuse of dressing the lead ore, is a sufficient guarantee that the mine must have opened out on extremely rich courses of ore. In fact, there are more extensive workings on this lode than on any other in the district. At the mouth of the deep adit level the south and the middle lodes form a junction, and just at the point of this a shaft has been sunk a few fathoms on a good course of ore.

No machinery was erected by the old miners, and everything had to be done in the shape of dressing the ore in the old fashion, by bruising it down to a fine size by means of small bucking-hammers, and, consequently, a great deal of ore remains in the waste stuff to be handled over, and which can be cleaned and made saleable at considerably under one-half of its value. The most extensive workings were carried on on the middle lode, where large and extensive courses of ore have been worked away to the deepest point yet reached, which is about 10 fms. under the deep adit level. This course of ore was worked away about 12 years since, by the late Capt. Matthew Francis, who worked the mine in conjunction with some other parties from Aberystwith for a considerable time, and at some profit, his intention having been to form a good company to work it spiritedly, but which, owing to his death, did not take place. It was his opinion, often expressed, that Tyllwyd was one of the best mines unopened in this county.

I may here remark that no man was so well acquainted with, or could form so accurate an opinion of, the Cardiganshire mines as the late Captain Matthew Francis; in fact, his statements regarding these mines have in almost every instance been verified to the letter; and now that a good company has been formed for the working of this property, with more than ample capital for all purposes, there is not the shadow of a doubt on my mind that more than all he ever said or thought of this mine will shortly be realised. It cannot be otherwise; for, to my own knowledge, not only is there a rich course of lead ore left in the 10-fathom level under adit, but there is an abundant quantity of paying ground left over the adit level in different places, which, as soon as cleared (and cleared they must be, for all the stuff in these old stopes or workings are filled with ore, which must be dressed over) can be worked away at half profit. Again, the adit level is precisely in the same position as the deep adit at Goginan was when the late Captain Francis bought that mine and worked it. The most westerly bunches of ore have been worked to the deep adit and under it, as before stated, but the eastern bunches of lead worked by the old miners have never been reached, and it is only to press on this adit on the middle lode—and this should be attended to at once—to get under fresh courses of ore; that would undoubtedly lay open thousands of tons of lead ore, and bring the property into a lasting and largely dividend paying state. On the south lode, also, extensive workings have been made, and large returns obtained from it; and, as these veins unite a little to the west of the adit's mouth, as soon as the engine-shaft shall have been sunk to a depth of 20 fathoms under adit, a level should be started and pressed on to this point with the utmost energy and dispatch, as from this point westward for a considerable distance there is every probability of laying open a most valuable and extensive course of lead ore. To the north of these lodes, the north lode, until within the last few months, has never had a fair trial, and may be said to be standing untouched throughout the entire length of the grant. In driving on this, some good lead ore is now being obtained, and it will soon be proved further eastward by cross-cutting north from the middle lode, there being little more than a fathom to drive to accomplish this object.

The present company are now putting up a large water-wheel, 40 ft. diameter, and good dressing apparatus, with extensive crushing power, &c., which will be worked by the river Rheidol, and where there is an abundance of water in every season of the year. The great desideratum is to get this machinery quickly to work. As soon as this shall be done success is an accomplished fact, for there are many thousands of pounds worth of lead ore in the refuse that can be made saleable at the present price of lead ore, worth 15*l.* per ton, for the sum of 6*l.* per ton, and this is a high figure to pay for dressing it. This refuse ore will serve to make a real good dressing-floor during the time of opening the mine properly, by stoping down the rich portion of the veins, and will give ample time without pressing for every desired purpose. Looking, then, at this property as it really stands, I think it would be difficult to find another in a similar position. First, it is a well-known fact that rich courses of ore are existing at the 10 fm. level under adit on the middle lode. Next, it is quite as clearly ascertained that there is a very large quantity of good paying ground in the old stopes above this level, which can be worked as soon as cleared. There is, besides, the fact that before the adit forebreast on this lode there are very extensive courses of ore which have been worked by hand-power from surface as deep as the old men could draw the stuff, and there can be no question of finding these courses of ore rich when the level has been extended eastward far enough to get under them. On the south lode all that has been done shows that not only have good courses of ore been taken away by former workers, but that good courses of ore have been left standing by them as well; and as soon as the present shaft has been sunk to the required depth, which will only occupy a few months, there is a certainty here of opening out good paying ground. Then, again, we have to look at the probability of finding very rich courses of ore at the junction of the lodes before referred to, and the probability of finding the north lode producing lead ore in paying quantities. Taking all these facts, and looking at the property fairly and with an impartial feeling, no one can doubt that these shares must go very high, as the mine is opened out from month to month, and I shall not be surprised if eventually the profits reach the very respectable figure of 10,000*l.* a year, or even more."

We may add that the shares are in demand in the market, and there is considered to be every probability of their reaching a high premium. As the capital is small in amount, but a moderate profit is required to pay large dividends. The company is decidedly worthy of the attention of investors.

Meetings of Public Companies.

SILKSTONE FALL COLLIERY COMPANY.

The third ordinary general meeting of shareholders was held at the City Terminus Hotel, on Monday,—Mr. G. WELLS OWEN in the chair.

Mr. C. MINSHULL (secretary) read the notice convening the meeting.

The report of the directors, whilst congratulating their fellow-proprietors on the continuance of a favourable dividend, regretted that the daily outout of coal has not increased according to their expectations. The managing director, on whom devolves the internal management of the colliery, assigns several causes for this; one of which is that although there are a very much larger number of men at work now than when the company took over the property, the amount of work done by each man (on the principle now adopted by all the working colliers of stinting the output) is very much less than formerly. This re-acts upon the prospects of the company in several ways, one being that a much larger floating working capital is required than was formerly necessary to work the concern. The colliery, in common with all in the district, has suffered much during the past half year from the want of trucks, in consequence of the railway company suddenly withdrawing all their own, and obliging coal owners to increase their supply at short notice. Another drawback to the company's success has been the old contracts, which date back from the time of the commencement of the company's business. All the coke made is still being sold at about 12s. per ton. Adding to this the fact of there having been a good deal of capital spent lately that has not yet become productive, it will be seen that the affairs of this company are in a good and progressive position, and that continuous good profit may be expected. Notwithstanding all these drawbacks, a very good profit has been made from the half-year's working, which enables the directors to recommend the continuance of the 15 per cent. interim dividend. The wagon works have been largely extended during the half-year, and a good deal of rolling stock built and repaired. The sidings also have been considerably increased and extended; preparations have also been made to lay down the brickworks, and the directors would recommend that the remaining capital of the company should be called up, so as to enable them to complete these and the various other works in hand.

At the last meeting the shareholders instructed the board to place 1000*l.* from profits to the redemption fund, and to invest that sum in building cottages for the workpeople upon a long leasehold plot of land. The directors having found, after much negociation, that they were unable to procure any long leasehold land in the neighbourhood of their colliery, have invested this sum instead in railway wagons, built at their own works, and let on redemption rental to the Industrial Coal and Iron Company (Limited); this they consider a safe investment, and one that will give good interest to increase the redemption fund. The board has entered into an arrangement with Mr. Nicholson, as salesman, and Mr. Booth, as managing director, for the year ending Dec. 31, on the basis of a payment of 7½ per cent. upon the profits; this the board believe to be a very ordinary agreement in like circumstances, and is the same percentage that the shareholders of the Industrial Coal and Iron Company (Limited) have themselves voted to their managing director.

Mr. Reuben Cooper, of Ardwick, Manchester, who held a seat on the board until the last shareholders' meeting, when, upon his resigning in the usual course of rotation, he was not re elected by the shareholders, thereupon made a claim against the company for 800*l.* as alleged damages for breach of contract. The directors offered to refer the matter to arbitration, but this was refused. Mr. Cooper, upon this, brought an action against the company, laying his damages at 1500*l.*, which he afterwards increased to 2000*l.* Notwithstanding a further offer by the company's solicitor to refer the matter to arbitration, Mr. Cooper pressed the case to trial; it was set down for hearing at the late York Assizes, and the Chairman, managing director, and secretary attended on behalf of the company. On calling the case on Mr. Cooper's counsel agreed with those of the company that it was a case the judge would not take, but that it should be referred to arbitration, which has been done.

The CHAIRMAN said he had but little to add in amplification of the report. There was a balance of 2290*l.*, but their actual position was much better; 847*l.* had been expended on wagon works and in re-building rolling-stock for the colliery, which had been valued at the depreciated price. Properly that amount should have been charged to capital, but it had been charged to revenue; the only effect, however, was to make the property better than shown in the accounts. It was always very difficult in starting a company to find a book-keeper who clearly understands what is capital and what revenue. The 1000*l.* set apart at the last meeting out of the profits as a redemption fund, to be set apart for the building of cottages on leasehold land, had in the interests of the company been otherwise applied. It was found that land could not but be obtained upon a longer lease than that upon which the colliery was held, and the money had, therefore, been employed in finishing the wagons that were building, which would return to the company an interest of 10 per cent., as against about 5 per cent. which the cottages would have yielded. These wagons were let on a redemption rental, the first six months of which had not yet accrued. As to the action of Mr. Reuben Cooper, the late director, against the company, he (the Chairman) might mention that when Mr. Cooper was elected upon the board he held a contract with the company, which was made by Mr. Booth, and never brought under the notice of the board. Mr. Cooper was urged either to resign his seat or his contract, and he chose the former. The question had been arbitrated upon, but the award had not yet been given. Mr. Leonard Cooper appeared before the arbitration in favour of Mr. Reuben Cooper, and the only evidence he had to give was a private conversation he had had with Mr. Booth, in which Mr. Booth said he ought to give up the coals. As to the question of output, it had not answered their expectations, and it was difficult to say why—perhaps Mr. Booth would give the explanation. When it was first taken over the output was stated to be 200 tons per day, but for the six months ending June 30 the amount returned was 27,234 tons, which, calculating the working days at 150, for the colliers had now something like two days a week, averaged 150 tons per day. This diminished output reacts very much against the profits of the company, because there were certain fixed charges. He did not think a greater profit would be realised or the position of the company improved by cavilling at small expenses; they must go deeper than that. The profit made upon the coal depended upon two things—the cost of raising it and the price at which it could be sold. It had been sold at the prices current in the district, but the cost of raising it was a subject he could scarcely go into; it depended upon the managing director whether the cost could be reduced or not; there was no doubt he had done his best, and had raised the coal as cheaply as he possibly could. If the shareholders from Manchester whom he saw present had really the interest of the company in view they would co-operate with the directors in endeavouring to reduce the cost of raising the coal rather than cavil about the London expenses and the directors' remuneration. In the report it was suggested that as additional capital would be required to carry on the brick-works and other things, which had caused the account to be rather over-drawn, more capital would be required, and it had been proposed by some shareholders that instead of calling up the remaining 1*l.* per share debentures should be issued, bearing (say) 8 per cent. per annum: as the property pays 15 per cent. the shareholders would get the advantage of the extra percentage upon the money. The present was the last occasion he should have the honour of addressing the shareholders as the Chairman of the company, in the history of which there had been two eras—one the struggle for capital, which was no ordinary task, some people saying that it would never be got together. Mr. Nicholson made arrangements with the vendor by which he allowed the purchase money to be paid off by instalments; at one time the result was so doubtful that he (the Chairman) took 100 shares, paying for them 350*l.*, to save it from collapse; and it was only when Messrs. West and Co. took the matter in hand that the company was really floated and placed upon a sound basis. He (the Chairman) found his professional duties were such as to prevent him any longer giving sufficient time to the affairs of the company; he, therefore, placed his resignation in the hands of the meeting. He had done his best to make the company a success, and had worked hard—very hard—to realise satisfactory results, and was very sorry he had not merited the approbation of shareholders. He then moved that the report and balance sheet be received and adopted.

Dr. HOLLINGS seconded the proposition.

The CHAIRMAN, in reply to questions, stated that the balance was 3*l.* overdrawn in London. There was 7000*l.* uncalled capital—revenue had lent capital the amount of the proposed dividend; therefore, when capital repaid revenue there would be a sufficient amount to pay the dividend.

Mr. BOOTH (the managing director) said the principal creditors had been paid.

Mr. STURGES submitted that the 1000*l.* carried to the redemption fund should not have been appropriated to an entirely different purpose without first consulting

the shareholders, and that no more calls should be issued until the whole of the shares had been issued.

The CHAIRMAN said it was perfectly competent for this meeting, if the shareholders thought fit, to cancel the bargain, for no doubt the Sheffield company would be perfectly willing to take the trucks and pay for them with accumulated interest. As to issuing the reserve shares, there were only 200 which would have been placed, but when people were continually receiving intemperate circulars they naturally thought something was wrong, and did not take the shares; they were being placed until Mr. Leonard Cooper's circulars were flying all over the country.

Rev. Mr. STURGE urged a reduction of the percentage on the sale of the coal. After some further observations he moved, as an amendment, that the directors be called upon to resign.——Mr. WHITEHEAD seconded the amendment.

The CHAIRMAN, in reply to questions, stated that the coke contracts were entered into at the inception of the company before he knew anything about the company. There were only two contracts for coal, it having been determined some time since not to enter into contracts, but that the coal should be sold at the current prices of the day.

Mr. BOOTH (managing director) said that one contract was for the delivery of 80 tons of coke per week until Nov. 1; at present they were unable to deliver the full quantity; it cost 2s. 4d. to burn, and 3s. 3d. for labour per ton. There was another contract for 1000 tons, of which there was due a balance of 126 tons, and another of 5000 tons, of which there was due a balance of 3981 tons. The contract was made at 12s. per ton in May, 1872. He made the last contract at the price at which it could be made in the market, and the only price the contractors were willing to give.——Mr. NICHOLSON said he knew nothing about this contract, nor did the directors until after the lapse of a long time, then it was made known by Mr. Booth.

Mr. BOOTH said there were two old contracts made with the United Gas Coke Company of London and the Sheffield Gas Company: of the former there were about 800 or 1000 tons to be delivered at 7s. 6d. per ton—the contract was dated June 21, 1872. The contract with the Sheffield Gas Company was 200 tons per month for 12 months from Jan. 1.

Mr. NICHOLSON believed that was at 12s. 6d. per ton. The prices now being obtained were 17s. 6d. for the Thorncliffe, 15s. 6d. for the Four-feet, and the gas coal—that is, the unscreened—from 14s. to 15s. per ton.

Mr. BOOTH said up to May last the cost was 6s. 8½d. per ton, including labour and everything into the wagons; but between May 22 and last week the rate of labour had so much increased that the cost was 7s. 3d. per ton; there were 96 sets of tools, representing about 150 colliers, and some of them now earned about 1*l.* per day: they were paid by the weight of coal they got.

Mr. REUBEN COOPER reviewed at some length the various points referred to in the report, and expressed disappointment at the results this colliery had realised when they saw around them other collieries giving dividends of 50 to 100 per cent.

Mr. NICHOLSON: But they have no such contracts as the Cooper's. (Laughter.)

Mr. R. COOPER did not think it showed all the profit the colliery had made. He believed this game of playing at wagon work was taking all their money. He urged the removal of the offices from London, and suggested that a Committee of Investigation should be appointed, for he believed that everything at the colliery had been undervalued.——Mr. KIMBER did not wish to make a charge against any one of the directors, but urged that the report should not be adopted, and that the offices be removed from London.

After some further discussion of an unimportant character, the report was adopted by 13 to 11. The Chairman and Messrs. Nicholson and Booth (directors) resigned, but Mr. Booth was requested to continue in office, and consented. Messrs. T. W. Baker (of Saddeworth), G. Tattersfield (of Mirfield), and — Culpan (of Halifax), were elected directors in the room of the two resigning and the one deceased. Mr. Kimber and the Rev. Mr. Sturge were rejected.

It was resolved that the 1000*l.* invested in wagons be allowed to remain.

The CHAIRMAN proposed that the directors be empowered to raise 10,000*l.* on debentures on the best terms they can obtain. To this an amendment was proposed, which was carried, that a call of 1*l.* per share be made.

Mr. Clay was elected auditor in the room of Mr. Jackson.

A vote of thanks to the Chairman closed the proceedings, which lasted just four hours.

LANESTOSA LEAD AND ZINC MINING COMPANY.

The ordinary general meeting of shareholders was held at the company's offices, Queen-street-place, on Thursday,

Mr. WILLIAM COX in the chair.

Mr. H. SWAFFIELD (the secretary) read the notice convening the meeting, and the reports and statement of accounts were submitted.

The CHAIRMAN stated that it was necessary that seven shareholders, holding 1500 shares, should be present, and as they had, in addition to the full number of shareholders, proxies representing 4400 shares, he declared the meeting duly constituted.

The directors stated that the company's financial year having closed on June 30, they had taken the earliest opportunity of presenting a statement of the company's accounts up to that date. These accounts show that the total expenditure during the year amounted to 3949*l.* 2s. 6d., against which there was 915*l.* 6s. 6d. for ores sold. They also show that the company was free from liabilities, and had still a cash balance of 667*l.* 9s. 1d. The report from Captain Gifford, the company's superintendent in Spain, fully describes the operations carried on during the past year. The result has been rather discouraging, the mines having yielded less ore, both of lead and calamine, than had been expected. There are still points of promise in the mines, any one of which when further explored may open out ore in large quantities; indeed, quite recently, a good deposit of both calamine and lead ores has been met with at the Asencion Mine, and the superintendent estimates that about 150 tons of ore will be obtained from this source. The workings at the least promising mines have been suspended, in order that the company's capital may be husbanded as far as possible, and employed on such mines only as offer encouraging prospects of success. Operations have recently been commenced upon the company's mining ground at Matienza, described in Capt. Gifford's report as La Berta pertinencia. There are four lodes passing through this sett, and it is believed that these lodes converge and form one main lode at no great depth from the surface. A shaft has already been sunk to a depth of 10 fathoms with a view of proving these lodes, and one has already been reached; this lode is interspersed with lead, and presents favourable indications. In order to prove these lodes, and to complete the trials at the other mines, some further capital will be necessary. There are now 165 tons of calamine and lead ores at the mines awaiting shipment, which will be realised as soon as possible.

The CHAIRMAN, in moving the reception and adoption of the report, remarked that it set out very fully the financial position of the company, in stating that they had at the time the report was made 667*l.* in hand, and 165 tons of lead and calamine ores, worth between 800*l.* and 900*l.* In the greater part of the work done they had not been so successful as they could have desired, but within the last two or three months they had made a discovery which had enabled them to bring their returns up to cost, and given them much more encouragement. It had consequently been a question with the directors as to the desirability of making a call, as they felt that, having come to a more promising point of their operations, it would be throwing away what they had spent if they did not spend a little more in trying to recover it. Mr. R. Taylor had been to the mines, and would presently make some observations upon them. He was glad to say that Mr. Taylor's opinion was better than they had expected. The agent's report was not so encouraging as it might have been, but he could speak more favourably of what had been done since, for by later advices they learned that in la Asuncion they had a level worth 5 tons of calamine ore per fathom. He might remark that in recommending in the report that a call should be made, they had done so to ascertain the feelings of the shareholders in the matter, for it must be understood that the directors had power to make the call without consulting the shareholders; but if the shareholders generally had been desirous to stop making calls and discontinue the operations, the directors would have carried out their wishes. They had, however, proxies representing more than half of the shares in favour of continuing. At the board meeting that morning they had, therefore, been considering the question of finance, and they found that with the ore at the mine they had about 900*l.* If they made a call of 2s. 6d. per share (they had recommended 5s. in the report) it would give them another 900*l.* With 1800*l.* they would be able to go on for another six months, and they had, therefore, concluded that a 2s. 6d. call was sufficient to make at once, and at the end of six months they would be better able to arrive at a definite conclusion; if the mine were then better in appearance they would, of course, make the call; if worse, they could determine to wind up. He believed this course would meet the views of the majority of shareholders, and concluded by formally moving the reception and adoption of the reports and accounts.——Mr. WILLIAMS seconded the motion.

Mr. SOLOMON had intended to oppose the call in the way it was put in the report, as their prospects appeared unfavourable. He thought they had a man at the mines as superintendent who did not exaggerate anything, and after reading his report he certainly thought it better to wind-up; but what the Chairman had said in modification had somewhat altered his opinion. In the absence of more definite information, he thought there was no justification for making a call of 5s., for the substance of the report was discouraging in the extreme.

Mr. R. TAYLOR was very sorry to hear the observations which Mr. Solomon had made, especially as he had called there as soon as the report was issued, and had done him the honour of sending for him to ask his opinion on the matter. He had hoped that he had convinced Mr. Solomon that the report did not at all bear the interpretation which he had put upon it. He had told him that he had come to a perfectly different conclusion, and the advices since received had confirmed his views. The property presents a large number of promising points, and in the debris there were such encouraging indications that it was difficult to know where to begin. They had proved a great number of different points, and Captain Gifford has explained where much calamine must have been raised from the outcrop, but calamine is a mineral which often holds to a small depth, and gives place to other minerals below. Capt. Gifford said that he had met with a large cavern at Asuncion, and they had a lode both in the bottom and ends. He might say that since that report they had further news, and that a level was being driven south, with favourable indications. Mr. Solomon considered the four last paragraphs of Capt. Gifford's report to be unfavourable, but he thought them otherwise, and he was quite sure that Capt. Gifford did not so intend them, but that he had been so frequently disappointed that he was afraid to write in a more sanguine tone. In one of these paragraphs Capt. Gifford writes that "The working out of the ore discovered in Asuncion, and the proving its continuance or otherwise beyond the cave, will, I presume, take place as a matter of course; and, for the reasons already given, I think some further explorations should be made at San de Uso shaft (Glanrafon), and Pardo's shaft (Aurora), which could be prosecuted at the same time the lodes of La Berta are being tried, where, from every appearance, we have a strong prospect of opening out a good mine—only the disappointment met with at the other mines would make me doubt the result of the work at this last one." There the manager certainly stated that they had a promising prospect. He said they had a good mine there. The directors had continued to work the mine, and Capt. Gifford, in his latest advices, told them that they would cover cost. The trial of Glanrafon had been an expensive one, but it was not without promise; and in speaking of San de Uso shaft he said that it should be continued. In his last letter he said they had large blocks of blende, which was always an indication of lead in that country, and, therefore, very satisfactory. La Berta was acquired many months after the other properties, owing to certain legal difficulties, so that they only got possession late in last year, and he might tell them that he had seldom seen a lead lode more likely to become a good one than that at La Berta.

The CHAIRMAN quite concurred with Mr. Taylor that it was only from the great disappointments which he had met with that Captain Gifford was shy at expressing an opinion. If at the end of six months they still met with disappointment he would be the first to say give it up, but he was certainly in favour of further trial at present.

Mr. SOLOMONS did not wish to oppose the directors, whose large personal interest in the concern as shareholders was, he knew, an ample guarantee that they would exercise their best judgement.

The report and accounts were then unanimously adopted; Messrs. Wm. Cox and J. R. Peill were re-elected directors, and Mr. G. T. Rait auditor for the ensuing year, the vacancy arising from the resignation, through ill-health, of Mr. De Mancha not having been filled up.

Mr. SOLOMON said that as he had made a few adverse remarks, he would like to be permitted to propose that their best thanks be given to the Chairman and directors, for he could assure them that he had implicit confidence in them.

The vote was carried with acclamation, and having been duly acknowledged, the proceedings terminated.

NEW DOLCOATH TIN AND COPPER MINING COMPANY.

The second half-yearly general meeting of shareholders was held at the London Tavern, on Thursday,—Mr. FRASER in the chair.

The report of the directors stated that in the ordinary course the present meeting should have been held during July, but as the trials with the patent hammer stamp were then being made, it was thought advisable to defer the meeting until a satisfactory decision thereon could be arrived at. The directors now regret to report that the result of the trials is not such as to warrant them in adopting the stamp in its present form. The patent stamp undoubtedly stamps the stuff well and a large quantity of it, with much less "slimes" than the ordinary stamps, but at such a cost for fuel as more than counterbalances any of its advantages, and it is for this reason alone the directors have decided not to adopt it; should the patentees, however, succeed in reducing the consumption of fuel to something near that of the ordinary stamps, there is no doubt the patent stamp possesses many advantages, and it is not unlikely yet to come into general use, but so much time has already been spent in making the various trials, though at small pecuniary cost to the company, the directors do not feel justified in waiting any longer for a better result. Under the foregoing circumstances, the directors have decided to erect 24 heads of the ordinary stamps, and have given Messrs. Vivian and Son instructions to purchase them without delay, as also to secure a certain piece of ground for the dressing-floors, &c. This ground is within a short distance of the mine, and has a constant stream of pure water running through it, which at all seasons of the year will be ample for the dressing of tin on a large scale. The cost of carrying the ore to the floors will be trifling, and will be more than compensated for by the saving effected in not having to pump the water required for dressing, &c.

Aug. 19.—Since the last general meeting of shareholders good discoveries have been made, adding to the value of the property. We will refer in the first place to the copper ore laid open between the 140 fm. level and the 130, which still continues above the latter, where we are rising through it, and where the lode, although only 1 ft. wide, yields 2½ tons of good copper ore per fathom. Of course, this quantity of ore in a lode of such little width is more profitable than if it were scattered throughout a large one. At the last meeting of shareholders we were sinking below the 140, just under the copper ground already referred to, and the lode there yielded 4 tons of copper ore per fathom. This induced us to think that we should find considerable quantities of this ore in depth, which, with the addition of that being laid open above the 140, would enable us to make good sales, and from this source alone pay the general expenditure of the mine. A great change has, however, taken place in sinking below the 140, the copper having gradually become less, and tin ore taken its place, so that we have not been able to make the copper sales which we relied on. This change may, however, be regarded as one of great advantage to the property, as it shows that we may look as a certainty to the realisation of the same splendid profits from tin as have been derived in the adjoining mine, Dolcoath, under precisely similar circumstances from the same lodes. This sink under the 140 is now down 7½ fms., where we find the lode has opened out to a great size, of which we have seen thus far a width of 10 ft. without meeting with the south wall. We are now working a width of 6 ft. of the north part of the lode, which is producing tin worth about 35*l.* per fathom. In the bottom, however, the lode is increasing in value, and will probably yield 1 ton of tin per fathom. Accompanying this improvement are traces of granite. We have recently cleared out the 33, west of the engine-shaft, and find that we have an immense section of ground completely unwrought in this part of the mine, to give an idea of which we have to notice that the 33 has a depth from the surface of from 70 to 80 fms., and that in this space not a single foot of the lode has ever been yet wrought, or even seen. We find that there is a good deal of mineral ground, consisting of tin and copper ores, already discovered in the back and bottom of the 33, which may be worked profitably. We have commenced driving this level west, where the lode is at present 2 ft. wide, and yielding tin and copper worth 12*l.* per fathom, whilst the price for driving through it is 5*l.* 10*s.* per fathom. In driving the deep adit level west, on the Town lode, we have not yet met with any satisfactory results, but we still think that this lode will be found to contain copper and tin from which profits may be derived, and we, therefore, regard it as an important part of our property. But the other parts already referred to will yield more immediate results, and it may be, therefore, wise to suspend operations on it until the other resources of the mine are rendered available. We regret the long time which has been absorbed in the attempts to bring the patent stamper into an effective and economical state of working, but, having once taken this machine in hand, we felt it would be unjust to the patentees not to allow them every chance of rendering it a success. We have now to report that the machine is a success to this extent—namely, that it will stamp the tinstone just as well as the old Cornish stamps, but that in doing this it consumes a much larger quantity of fuel in the reduction of the same quantity of tinstone. It cannot, therefore, be regarded, in its present form, as a success in a commercial point of view. It must now be our business to provide ourselves with the Cornish stamps with as little delay as may be consistent with economy. It seems likely that good second-hand machines may soon be obtained at a cheap rate, and we purpose looking out for such. We have many hundreds of tons of tinstone broken and prepared for stamping now on the surface, equal in quality to that of the large and profitable mines in our neighbourhood. We have also tin ground in several parts of the mine where we can employ a large number of men, and thus keep up supplies for the future, from which good profits will result, even with the present prices of labour, mining materials, and tin. But we feel confident that we shall ere long carry on mining operations under much more favourable conditions in each of these departments, and realise proportionately higher profits. Nor must we omit to mention, when referring to the profits which are to be realised from this property, that no mine in Cornwall is so favourably circumstanced as this is, seeing that we have such a rich belt of lodes traversing our ground, and that we can work them from the surface to a depth of nearly 190 fms. without the heavy cost of drainage which other mines have to contend with, and but for which their profits would be much higher than they have been.—J. VIVIAN and SON.

The CHAIRMAN moved that the report and balance-sheet be received and adopted.

Mr. T. E. W. THOMAS seconded the proposition.

Mr. W. C. VIVIAN (Messrs. Vivian and Son), in reply to questions, stated that at the surface there was something like 800 tons of tin-stuff ready for the stamping-mill. The 24 heads of stamps would, probably, be ready in about three months after purchasing. His idea was that the stopping of mines in Cornwall would have the effect of reducing the price of labour, materials, and also a higher price for metals. They proposed erecting their stamps in a valley, where there was a never-failing supply of water, and in the meantime they might obtain the use of some at a rental. Had they erected stamps twelve months since they would by this time be in a position to pay a dividend. He calculated the cost of a 16-stamps axle would be about 1600*l.* There were 71 hands employed.

Mr. VIVIAN mentioned that they could now obtain as much labour as they pleased. His opinion of the mine was more favourable than ever before; he believed it would be one of the best mines in that neighbourhood. No mine was better situated, adjoining, as it did, the richest mine in the county, the old Dolcoath, and both possessed the same belt of lodes. Dolcoath workings drained New Dolcoath to a depth of 200 fms.; the workings in the latter were 340 fms. deep, and in New Dolcoath 187 fms. There was no reason whatever why the mine, which had a run of ¼ mile on the course of the lodes, should not be as rich as Dolcoath.

Mr. ATKEY (Donald, Atkey, and Co.), the patentee of the steam-hammer stamp, stated that he had very great difficulties to contend against, not the least being the want of water with which to work his machines.

Mr. VIVIAN said that when the machine was first put there, and for some time afterwards, there was an ample supply of water; there was a large stream of water for two-thirds of the year, falling off only in the summer.

Mr. ATKEY did not think the company could reject his machine simply because facilities were not provided for working it. One great advantage of the machine was that it could be removed and erected elsewhere in a couple of days.

Mr. VIVIAN said, however perfect the machine may be in stamping, it would always require another to supply it with water.

Mr. ATKEY said it required no greater fall of water than the old Cornish stamps.

Mr. VIVIAN said the old stamps engine was provided with pumping gear, which lifted the water.

Mr. ATKEY said it was a very easy matter to attach a donkey-engine to the boiler. The truth is Cornwall is the hotbed of prejudice, and opposition is raised to every invention, whatever its merits. His machine would and had easily stamped 10 tons per day. The managers had given him grates with the finest holes that could possibly be made. Had he been provided with grates similar to those used in the neighbouring mines he would have turned out 24 tons of stuff.

Mr. VIVIAN said the reply was a very simple one. Exactly the same size of grating as that used at South Condurrow was tried, and it was found the stuff came out quite rough, the reason being that it was forced through, whereas in the Cornish stamps the stuff could not be forced through, and, consequently, was crushed down.

Mr. ATKEY denied that statement—the stuff trickles through the grates. The machine had done everything promised of it.

Mr. VIVIAN said from a commercial view he condemned it; it stamped the stuff, and well, but it consumed more fuel than the old stamps.

Mr. ATKEY said the machinery had been condemned before it was tried. He was prepared to prove that the consumption of coal was less than that of the ordinary stamps, considering the quantity of stuff turned over, while its first cost was much less, and it was much more portable. Another point was, that it made much less slimes.

Mr. VIVIAN said is was impossible for it to do anything like its duty unless supplied with steam at 70 lbs. to the inch.

Mr. ATKEY said he had worked it down to 35 lbs. to the inch.

Mr. VIVIAN said that the men had refused to work it at such pressure.

Mr. ATKEY denied that most emphatically, having put the question to the man, who said he would not have the slightest objection to work it up to double that pressure, adding that it was the best boiler in Cornwall.

Mr. VIVIAN said his only answer to all this was that if this machine was such a great improvement upon the ordinary stamps it would have been to him personally worth many thousand pounds, having such a large interest in the mine.

Mr. COMYN said he had no doubt the steam-hammer stamp was a perfect success; taking blow for blow it must be as effective as, and much superior to, the old stamp-head, but the question of fuel had not been decided up to the present time. While arguing for the company, he contended the steam-hammer stamp had not yet had a fair trial. He believed it was much as superior to the old stamp-head as day is to night, and he believed any mechanical engineer would tell the shareholders so, but up to the present time there had not been the means of giving it a fair and legitimate trial. If this hammer would do what he had seen it do, which was equal to about ten or twelve heads, to wash the stuff through necessarily required that additional amount of water.

Mr. VIVIAN said he could prove to demonstration that it required four times the amount of fuel.

Mr. ATKEY was prepared to prove that statement to be entirely false, and in support of his statement would stake 50*l.* or 100*l.* against a similar sum on the part of Mr. Vivian.

The CHAIRMAN, in reply to a question, stated that the company were not bound to take the steam-hammer stamp, the agreement being that it should be taken if approved after a month's trial.

The motion adopting the report and accounts was then put and carried.

Mr. G. W. Clarke was elected in the room of Dr. Collis Browne, resigned in consequence of ill-health.

A vote of thanks to the Chairman and directors concluded the proceedings.

MAUGHOLD HEAD MINING COMPANY.

The half-yearly meeting of shareholders was held at the Castle Mona Hotel, Douglas, on Wednesday. Mr. JAMES ALLAN, Chairman of the Directors, presided; and there were also present the Rev. Canon Frew, Messrs. Charles Cleator, Stephen Steeds, and William Frost (directors); J. R. Macarthur, John-street, Bedford-row, London; R. Rowe, E. Callow, W. Beckwith, W. C. Beckwith, P. Bridson, H. Goss, H. Kellett, &c. Mr. Macarthur, acting for the secretary, read the directors' report and the accounts:—

In presenting their half-yearly report up to June 30 the directors would wish you to bear in mind that, although the company was registered in December last, it was not until May following that they were in possession to work the mines. The result of their labours in May and June is that they have erected a shipping stage at Dhyrnane—which, in the prospectus, was estimated to cost 500*l.*—at a cost of only 218*l.* 0s. 8d.; and they have completed arrangements for sinking mooring tackle, and a buoy for vessels to make fast to, all of which will be completed at less than half the estimated cost. Under contracts to deliver iron ore in Cumberland, at 5*s.* per ton, they have, up to June 30, received for ore already delivered, 800*l.* The ordinary working expenses of the mine, and the office expenses, salaries, &c., for the half-year, being 273*l.* 6s. 7d. The chairman, one of the directors (a civil engineer), and the solicitor, have, by direction of the board, visited the mines, and inspected every portion of them above and under ground, and the practical knowledge thus gained has enabled the board to take measures for working the mines at every available point with the greatest prospect of success. The earnings of the first half-year are sufficient to pay a dividend on the capital employed, but the directors deem it advisable not to declare a dividend until the whole, or nearly the whole, of the capital be subscribed for.

The Rev. Canon FREW: As the most recently-appointed director I believe it devolves upon me to move that the reports and accounts be adopted. The report, I think you will admit, is a most satisfactory one. We have only been two months—indeed, not quite two months (May and June)—at work, and, as you will have observed, up to the date of the report 800*l.* worth of ore had been sold, while all the expense of producing that ore, including that of the office and staff in London, has been 273*l.* 6s. 7d., leaving a profit of nearly 530*l.* on the 800*l.* This would leave a profit of about 13 per cent. per annum, but the directors in their prudence have thought it desirable not to declare a dividend at present. I think you will admit that the report is most satisfactory. All that we want now is the energetic development of the mine, and I have no doubt that it will be a most valuable undertaking—profitable to the island, profitable to the directors, and profitable to the shareholders.

Mr. MACARTHUR: I shall like, Sir, to say a word about this company, as I have had a great deal to do with it since its establishment, not only as a solicitor, but in other respects. I may say that nearly every communication that has come to the office, whether connected with the solicitor's business or not, has come under my notice, and I have always endeavoured to assist the secretary and others in their various departments. I was particularly attracted to this mining company, in preference to many others, because it is not like some in which I am concerned, but with which, mind you, I find no fault. For instance, there is one in which for about three years we have been laying out our money, and only last month we raised our first ton of ore, although we have spent three fourths of our capital. I repeat, I do not blame these other companies for this, for it is the nature of mining that we should go to a large expense in order to get large returns. But here, in this mine, we could walk up the levels to where the ore was lying, see it broken out, brought to bank, and sent away for shipment. It might be said, "If that is the case, why do you not take out a greater number of tons than you do?" The answer to that is very easily accounted for. It cannot be done, because the produce of a mine can only be in proportion to the space that the miners have to work in, and the levels can only be worked so long as the water can run off without machinery. So that hitherto the work has been confined to the driving of the levels and above them up to surface. But we were perfectly conscious that under our feet there was ore equal in quantity, and perhaps superior in quality, to be had if we went down a little. But there was this to be remembered—that the moment we went deeper, then the water would begin to collect. It is, then, with a view to getting the comparatively inexpensive machinery which will be required to effectually work this mine that we are using all our exertions to get a greater number of shares taken than have hitherto been taken; and then we shall get the necessary pumping machinery, in order that we may go down lower and get ore. This mine is, to my mind, a very promising speculation. There is nothing to search for. It has been searched for and found, and only remains to be taken out. The machinery we have hitherto been using would excite laughter, if compared with what there is at other mines—Great Laxey, for instance. Instead of getting expensive machinery, we have simply at Balajorra a one horse machine, represented by a farmer's horse. However, when we do get proper pumping machinery we shall hope to get larger returns, and thus increase the profits of the undertaking. It is in that hope that we have been offering the shares to the public; and we are glad to say that, notwithstanding the state of the money market, and the great discredit there has in some quarters been brought upon mining, about 1300 shares have during the last month been taken up; and this will, when the calls are made, put us in possession of some 3000*l.* or 4000*l.*, which will enable us to get the machinery we contemplate. We need not wait for very extensive machinery to enable us to get to work. The different points can be worked with small engines, and we can by degrees put up one here and one there as we require them. I am even more pleased with the parties who have taken the shares than with the number they have taken. There are some exceedingly good men amongst them. For instance, the late Mayor of Liverpool applies for 500. We shall now endeavour to save the expense of advertising by sending out circulars to our shareholders, and solicit them to bring the undertaking under the notice of their friends, and induce them to take shares as they have done. Each shareholder we may look upon as the centre of a little circle of friends and acquaintances, to whose notice he can introduce the speculation. I have no doubt myself that it will be a great success, and amply remunerate all parties for their outlay. The Rev. Canon Frew has pointed out the most important point in the accounts: 800*l.* has been received for ore sold, while the expense in obtaining it has been only 273*l.* The other items of expenditure are chargeable upon the capital provided by the sum raised by the subscriptions for shares, for which the shares are issued. The pure profit and loss is represented by the two items, 273*l.* against 800*l.* If we were to declare a dividend it would be about 9*d.* a share for the first six months, which would be about 15 per cent. per annum. I say six months, but we have really been working only two months. The directors, however, think it advisable to be under rather than over the mark, and that the dividend should be deferred to the annual meeting, by which time they will have had greater experience of the capabilities of the mine, and a longer period to spread the average over. My opinion is, however, that the dividend of the first months will be equalled, if not exceeded, by that of the ensuing six months, and that they will be in a position to declare an equally good dividend to that they could declare at this meeting, and to pay the dividend they will then declare. I would not have gone into these points had they not have been prominently brought before my mind by the many enquiries on the subject which have been made to me from time to time.

The motion, on being put to the vote, was carried unanimously.

Mr. MACARTHUR: I would now like to move that the report of this meeting, in some convenient form, be sent to all the shareholders, with a request to them to use all their exertions to get out the remaining shares, and so avoid further expense in advertising. I have much greater faith in individual exertions of this kind in getting off shares than I have in indiscriminate advertising. It generally requires something more than merely seeing an advertisement to get a man to take shares. A man must take another by the button, and say—This is a good thing. I am in it, and I should like to see you in it, too. Of course, advertising is necessary in order to give those who thus solicit their friends some precise data to refer to; but if our friends do as I propose in this motion, we shall have no need to incur further expense in advertising.

Mr. SUGDEN seconded the motion, which was carried.

Mr. MACARTHUR said that the reports from Captain Rowe appeared weekly in the *Mining Journal* and in the insular newspapers; so that the shareholders could, from week to week, trace the progress of the mine, and keep themselves fully posted up in everything concerning it. He knew that many of the shareholders took great interest in these reports; and one week, when the report did not appear, he had a letter from a gentleman residing in Edinburgh asking how it was. If the shareholders followed this gentleman's example, and carefully read the reports, they would be fully acquainted with every particular concerning the little speculation they were engaged in.

The CHAIRMAN: The formal business of the meeting is now completed; but if any shareholder has any remark to make, we shall be glad to hear him.

Captain R. ROWE: I beg to move a vote of thanks to the Chairman and to the directors for the labour they have bestowed upon, and the zeal they have shown in the working of, the company. They have really earned this vote of thanks at our hands, and this decided manifestation of confidence in them for the future. I think that we are in good hands, and on the high road to a successful issue.

Mr. W. C. BECKWITH seconded the motion, which was carried unanimously.

The CHAIRMAN: On behalf of myself and my brother directors, I have to express the great satisfaction indeed it gives us to have earned your approval, and I hope that while we are in office we shall always merit it. No exertion has been wanting to make this mine a success; and, as Mr. Macarthur said, we only want a little more of the sinews of war—money—to enable us to make this a profitable and valuable mine, and I do not think we shall have much difficulty in obtaining it. I thank you for the confidence you have displayed in us.—This concluded the meeting.

[For remainder of Meetings see to-day's Journal.]

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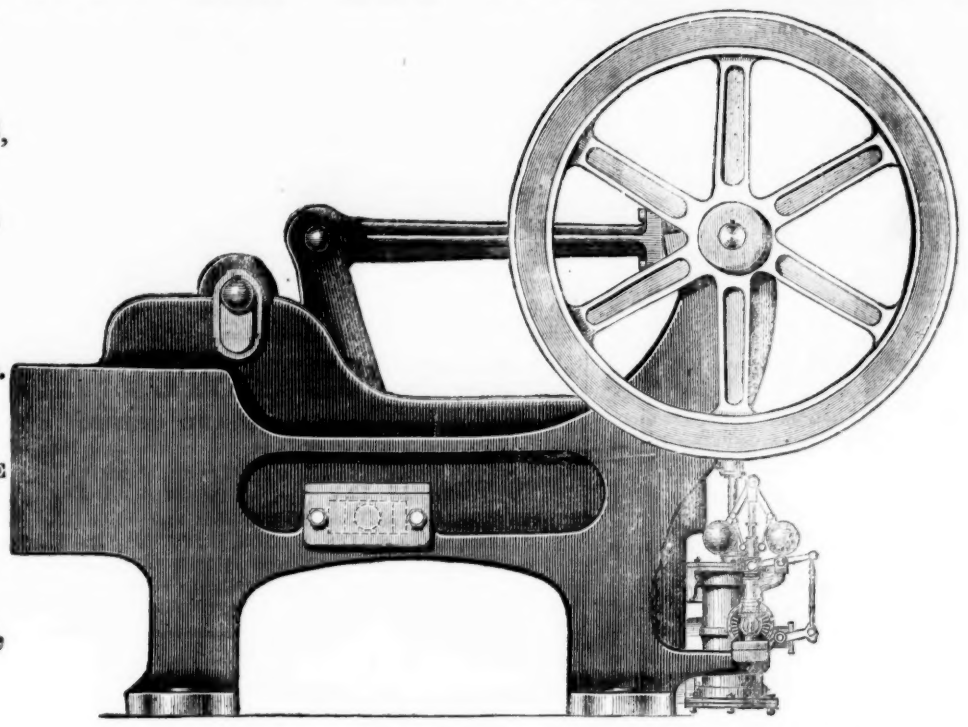

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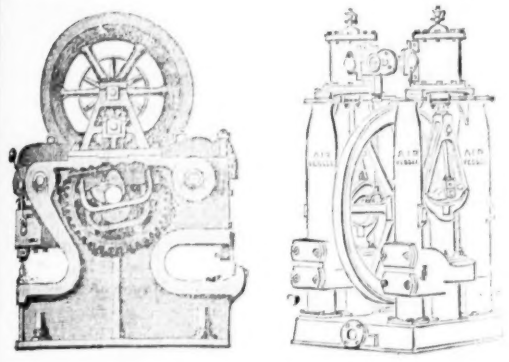

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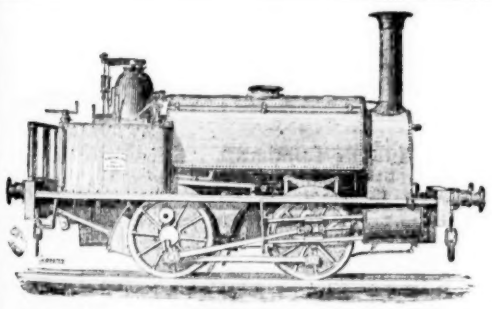

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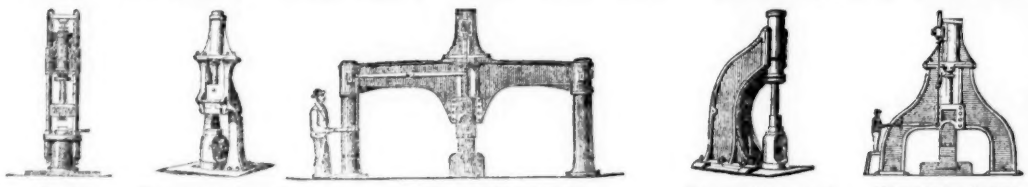

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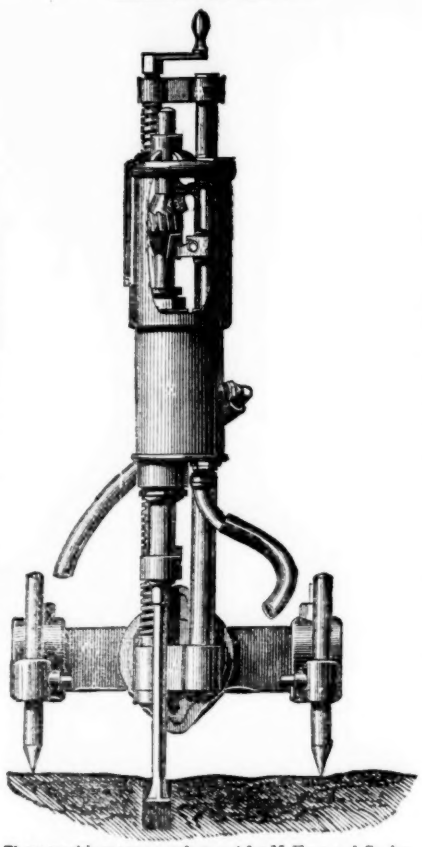

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The average circulation of the "Newcastle Daily Chronicle," as declared before the Right Worshipful the Mayor of Newcastle-on-Tyne, up to June 18, 1873, was

35,534.

From the detailed statement herewith annexed of the circulation of the "Newcastle Daily Chronicle" since that date it will be seen that the average circulation is upwards of

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Copies per day, which is believed to be

THE LARGEST CIRCULATION OF ANY PROVINCIAL DAILY NEWSPAPER.

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DECLARATION of GEORGE NESBITT, Public Accountant, Fellow of the Manchester Institute of Accountants:—

I, GEORGE NESBITT, of 11, Cross street, in the city of Manchester, in the county of Lancaster, Public Accountant, do solemnly and sincerely declare:—

1. That I have had produced to me, and have examined, all the publishing books and accounts, and the invoices and receipts for paper supplied by the manufacturers, from the Twenty-fourth day of March to the Fourteenth day of June, 1873, to the proprietors of the NEWCASTLE DAILY CHRONICLE and the NEWCASTLE WEEKLY CHRONICLE Newspapers, which are printed and published at the borough and county of Newcastle-upon-Tyne and elsewhere.

2. That the number of copies of the NEWCASTLE DAILY CHRONICLE, printed and published at the Publishing Office in Westgate-road, Newcastle-upon-Tyne aforesaid, from the Twenty-fourth day of March to the Fourteenth day of June, 1873, amounts to

2,558,490

3. That the said number of 2,558,490 copies of the said newspapers, so printed as aforesaid, gives for the period of Seventy-two Days, being the number of publishing days between the said Twenty-fourth day of March and the Fourteenth day of June, an average of

35,534

COPIES PER DAY.

4. That the number of copies of the NEWCASTLE WEEKLY CHRONICLE, printed and published at the Publishing Office in Westgate-road, Newcastle upon Tyne aforesaid, from and with the Twenty-ninth day of March to and with the Fourteenth day of June, 1873, amounts to

378,250.

5. That the said number of 378,250 copies of said NEWCASTLE WEEKLY CHRONICLE, so printed as aforesaid, gives for the period of Twelve Weeks, being the number of publishing weeks between the said Twenty-ninth day of March and the Fourteenth day of June, an average of

31,521

COPIES PER WEEK.

And I make this solemn declaration, conscientiously believing the same to be true, and by virtue of the provisions of an Act made and passed in the sixth year of the reign of His late Majesty King William the Fourth, intituled, "An Act to repeal an Act of the present Session of Parliament intituled an Act for the more Effectual Abolition of Oaths and Affirmations taken and made in various departments of the State, and to substitute declarations in lieu thereof, and for the more entire suppression of voluntary and extra judicial oaths and affidavits, and to make other provisions for the abolition of unnecessary oaths."

GEORGE NESBITT, F.M.I.A.

Declared at the Town Hall, Newcastle-upon-Tyne aforesaid, this Sixteenth day of June, 1873, before me.

RICHD. CAIL, Mayor,

One of her Majesty's Justices of the Peace acting in and for the borough and county of Newcastle upon Tyne.

The Number of Copies of

THE NEWCASTLE DAILY CHRONICLE

Printed during the week commencing June 16 was

ON MONDAY	JUNE 16	41,700
ON TUESDAY	JUNE 17	36,500
ON WEDNESDAY	JUNE 18	36,250
ON THURSDAY	JUNE 19	36,300
ON FRIDAY	JUNE 20	37,500
ON SATURDAY	JUNE 20	36,500
TOTAL NUMBER FOR SIX ISSUES		224,750

The Number of Copies of

THE NEWCASTLE DAILY CHRONICLE

Printed during the week commencing June 23 was

ON MONDAY	JUNE 23	40,000
ON TUESDAY	JUNE 24	50,000
ON WEDNESDAY	JUNE 25	53,000
ON THURSDAY	JUNE 26	48,000
ON FRIDAY	JUNE 27	40,000
ON SATURDAY	JUNE 28	40,000
TOTAL NUMBER FOR SIX ISSUES		271,000

The Number of Copies of

THE NEWCASTLE DAILY CHRONICLE

Printed during the week commencing June 30 was

ON MONDAY	JUNE 30	40,000
ON TUESDAY	JULY 1	39,500
ON WEDNESDAY	JULY 2	39,250
ON THURSDAY	JULY 3	39,500
ON FRIDAY	JULY 4	39,750
ON SATURDAY	JULY 5	40,250
TOTAL NUMBER FOR SIX ISSUES		238,250

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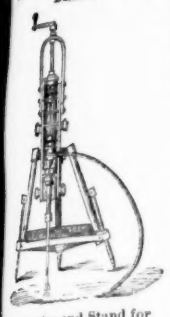

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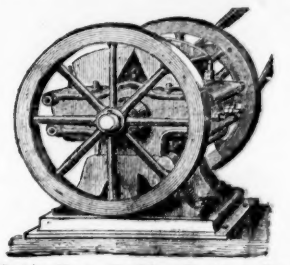

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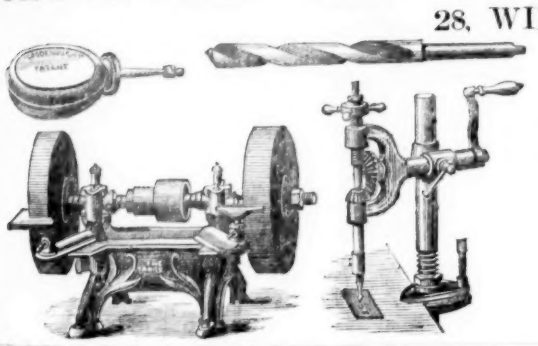

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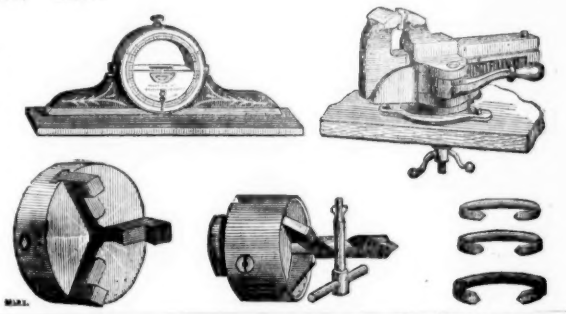

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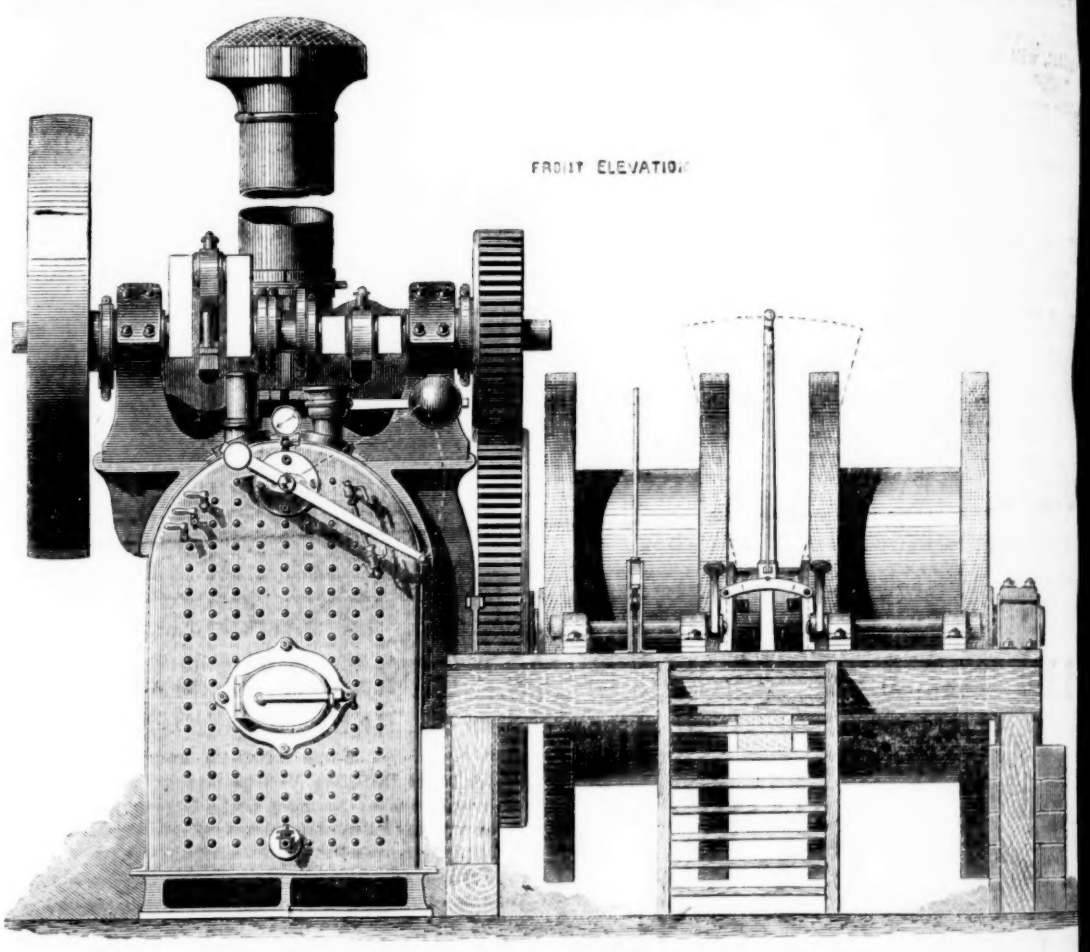

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